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DISEASES CAUSED BY BACTERIA AND FUNGI.

KLIMMER, M., & HAUPT, H. (1932). Infektionsversuche an altmilchenden Kühen durch Verfütterung von Galtstreptokokken. [**Infection Experiments on Cows at the End of Lactation by Feeding with Mastitis Streptococci**].—*Tierärztl. Rdsch.* **39.** 612-614. [8 refs.]

Attempts to produce infection of the udders of two cows in the later stage of lactation by feeding them successfully with 100 to 400 c.c. of mixed mastitis milk daily for 14 days and with 100 c.c. of a pure culture of *Str. agalactiae* daily for 36 days failed, although in both cases an effort was made to create a disposition to disease by overstocking and non-bacterial irritation. Eleven attempts to recover the streptococci from faeces failed.—A. W. STABLEFORTH.

STECK, W. (1932). Ein einfaches Verfahren zum Nachweis geringer Galtstreptokokkeninfektionen. [**A Simple Method for the Recognition of Slight Infections with Mastitis Streptococci**].—*Zschr. Fleisch- u. Milchhyg.* **42.** 397-398. [3 refs.]

Although micrococci may at times cause a slight degree of inflammatory reaction in the bovine udder they are usually harmless and attention should be directed towards the quick recognition of small numbers of streptococci. Microscopic examination does not suffice as samples, which by this method show no streptococci in 100 fields, may be shown by culture to contain 2,000 mastitis streptococci per c.c. The author has, therefore, devised a simple cultural method which utilizes the fact that streptococci, in contrast to other udder organisms, can in his experience be recognized in deep agar culture after 12 hours incubation.

Equal quantities of end milk from each quarter are collected in a previously marked tube, 180 by 18 mm.; 0·5 c.c. is pipetted into a tube containing 10 c.c. of agar, preferably containing serum and 2 per cent. of dextrose, mixed and incubated at 38° C. for about 12 hours. The tube is then examined. If no colonies are seen, or if only a few atypical streptococci (e.g. of the kind which produce a uniform turbidity in lactose broth, but which may appear typical on the medium of Klimmer, Haupt and Roots) the result is recorded as negative. If a few typical mastitis streptococci are found, or if many (up to 50 per c.c.) streptococci of any kind are found, the result is recorded as positive. In order to remove selected colonies for further test, or for microscopic examination, the agar is removed and cut up in a sterile petri dish.—A. W. STABLEFORTH.

URBAIN, A., RICAUD, L., & CAMUS, J. (1932). La Mammite Streptococcique dans le Pays de Bray. **[Streptococcal Mastitis in Bray].**—*Le Lait.* **12.** 489-501. [3 refs.]

Fifty-three quarters affected with mastitis were treated by means of the injection of a mixture of antivirus (BESREDKA) and bacteriophage for mastitis streptococci. In most cases the amounts were 40 c.c. and 20 c.c. respectively and the mixture was distributed by injections at about 60 places into the tissues of the quarter. The secretion was altered at first and the gland was somewhat sensitive, but within a week this had disappeared. Cures are reported in 42 cases, partial cures in six, and failure in one case only. The authors note, however, that streptococci still remain. Results are best when the operation is carried out shortly before calving or close to the onset of disease, but in many cases cures were effected during lactation. The production of normal secretion at the beginning of the lactation following treatment is taken as the real criterion of a cure.

[It is to be noted that the secretion of many quarters affected with mastitis becomes normal at the beginning of a new lactation and may continue to be so for a period of some months].—A. W. STABLEFORTH.

I. HAYDEN, C. E. (1932). **Field Tests for Chlorine in Milk for the Detection of Mastitis.**—*Cornell Vet.* **22.** 277-280. [4 refs.]

II. STERNFELS, M. (1932). **Bovine Mastitis. Aids for its Detection.**—*Vet. Med.* **27.** 332-335. [8 refs.]

I. Three rapid tests are detailed which are said to indicate with accuracy whether the content of a given sample of milk is above or below 0·14 per cent., which is regarded as the critical level. The tests are based on Whitehorn's method for blood, Rosell's method for milk and the Volhard-Harvey method for urine, respectively. The last test is preferred owing to the sharpness of the readings obtained. 5 c.c. of a solution containing 1·3415 g. of C.P. silver nitrate per litre is measured into a tube and 2 drops of a 10 per cent. potassium chromate solution added, when a red colour develops. 1 c.c. of milk is added. The colour is maintained if chlorine is under 0·14 per cent., but becomes yellow in one minute or less if it is 0·14 per cent. or more.

II. A brief summary of some facts in connection with mastitis, with regard chiefly to diagnosis.—A. W. STABLEFORTH.

FELTON, L. D. (1932). **Studies on Virulence. IV. Influence on Virulence of Pneumococci of Growth on Various Media. V. The Effect of Oxygen, Nitrogen, and Carbon Dioxide on the Virulence of Growing Pneumococci.**—*J. Exp. Med.* **56.** 13-25 and 27-38. 1 fig., 13 tables. [26 refs.]

A preliminary study of tissue extracts as media for the growth of pneumococci in an automatic transfer device showed that calf lung or heart, or horse muscle, but not calf spleen, maintained virulence (300 to 700 transfers at intervals of 2 hours), and that lung medium caused an increase in the case of 7 avirulent strains (600 transfers at 2 hours, or 189 at 8 hours).

The decrease of virulence which occurs in immune serum or in antibody solution does not occur in serum freed from protective antibody.

Media which aerobically maintained virulence failed to do so in pure oxygen, or carbon dioxide, but did so in nitrogen. Gradual increase of temperature over a period of 10 days from 36·5° C. to 42° C. resulted in a gradual decrease of virulence.—A. W. STABLEFORTH.

I. WILLIAMS, N. F. (1932). **Anthrax.**—*J. Amer. Vet. Med. Ass.* **81.** 9-25.

II. ROBERTSON, Madge E. (1932). **The Disinfection of Anthrax-Infected Dried Hides in the Dry Condition by Means of Hydrogen Sulphide.**—*J. Hyg. Cambridge.* **32.** 367-374. 4 tables. [3 refs.]

I. The author has made an historical survey of the literature on anthrax, especially in relation to the appearance of the disease in the United States of America, and the part played by the indiscriminate use of spore vaccines in the control of the disease.

A number of the important American outbreaks are mentioned and the probable causes are discussed. From the experience gained in dealing with these outbreaks and from the personal experience of the author in Texas, the necessity of abolishing the use of spore vaccines is emphasized and he advocates the use of aggressin in large doses.

II. The success obtained in the " wet " disinfection of hides with sodium sulphide suggested the possible value of hydrogen sulphide as a disinfecting agent for dried hides. A number of experiments were carried out by exposing anthrax-infected threads and dried hides for various periods to an atmosphere of hydrogen sulphide. The air was removed by means of a filter pump to allow a more rapid penetration of the disinfecting gas, but it appeared that good diffusion of the gas could also be obtained by displacing the air. Penetration of the gas was assisted by raising the temperature, since this increased the volume of gas in the chamber.

The author found that hydrogen sulphide had a destructive action on dry anthrax spores, but it is still doubtful whether the disinfecting gas actually penetrates into dried hides. If a good surface disinfection could be secured with hydrogen sulphide, the risk in handling the hides would be greatly diminished. The danger of infection to tannery workers is further reduced if the hides are subsequently subjected to a suitable sulphide-lime " wet " disinfection process. The latter procedure is usual in the process of tanning.—A. J. WILSDON.

RAW, N. (1932). **Human and Bovine Tuberculosis.**—*Lancet.* **223.** 900-901.

The subject matter of this article was delivered as a presidential address to the Hunterian Society on 17th October.

Recognizing several years ago that the eradication of tuberculosis from cattle is the best way to stop cases of bovine infection in human beings, the author began in 1906 an attempt to render *Mycobacterium tuberculosis* avirulent by continued subculture. After the 84th generation, attenuation was obtained and after 23 years the cultures were avirulent, but still antigenic.

Such living, but attenuated, cultures were used for the vaccination of over 6,000 calves and in human tuberculosis with alleged good results.

The mutation of the tubercle bacillus and several problems of pathogenesis in tuberculosis were also discussed.—J. E.

HALL, G. N. (1932). **Tuberculosis in Cattle—Its Occurrence in Northern Nigeria.**—*Vet. J.* **88.** 327-331. [1 ref.]

This article records a case of tuberculosis, due to a bacillus of the bovine type, in a native ox on the government stock farm at Vom, Northern Nigeria. The author remarks that tuberculosis has never been reported from abattoirs in Nigeria, but that cases in cattle and pigs occurred in Lagos in 1916, 1917 and 1918. Fifty-four cases occurred in 1917, whilst in 1918 only 18 cases were recorded. The incidence suggests that they had a common origin, possibly connected with the outbreak in the Cameroons.—U. F. RICHARDSON.

I. McCann, J. S. (1931). **(1) Observations on the Tuberculosis Order. (2) Some Interesting Cases and Methods of Treatment.**—*Vet. Rec.* **11.** 1289-1295.

II. Torrence, H. L. (1932). **The Diagnosis of Tuberculosis as Specified in the Tuberculosis Order of 1925.**—*Ibid.* **12.** 144-148.

I. The author discusses the question of fees paid to part-time veterinary inspectors in the Irish Free State and offers certain criticisms of the Bovine Tuberculosis Order in that country.

Cases are quoted in which errors of diagnosis have been made and it is stated that many of these would have been prevented had the application of the tuberculin test been permitted. The intradermal method of testing is preferred. The paper concludes with a dissertation on a variety of conditions met with in general practice in the Irish Free State.

II. The author describes the three types of tuberculosis specified in the Tuberculosis Order of 1925. The various forms of tuberculosis of the udder and their common characteristics, as well as the lesions which may be expected in cases of tuberculous emaciation, are also described. A discussion followed the reading of this paper, during which the presence of " cell groups " as an aid to microscopic diagnosis of suspected milk was stressed.—G. W. Dunkin.

Matthews, H. T. (1932). **Clinical Points in Examination of the Cow for Tuberculosis.**—*Vet. Rec.* **12.** 803-809.

This paper was delivered before the Derbyshire Division of the National Veterinary Medical Association in May, 1932. The essayist in somewhat racey style gives an excellent account of his methods of diagnosing tuberculosis in the dairy cow, in so far as the symptoms shown bring the animal within the scope of the Tuberculosis Order of 1925 [England and Wales, and Scotland].

The points to be noted by the veterinary officer who is called upon to carry out clinical examinations of cows are carefully enumerated. Great stress is laid upon the necessity of corroborating the clinical suspicions by the confirmatory evidence of the microscope in the examination of expectorates, milk or other material.

A careful study of this paper will be of the greatest assistance to all those whose duties include the routine clinical inspection of dairy herds.

—D. S. Rabagliati.

Messner, H. (1932). Kongenitale Tuberkulose bei Kälbern. [**Congenital Tuberculosis in the Calf**].—*Zschr. Fleisch- u. Milchhyg.* **42.** 437-439. [3 refs.]

During his 25 years experience at Karlsbad abattoir, the author has seen 202 cases of congenital tuberculosis in calves aged from three to five weeks. The most usual sites of congenital tuberculosis are the following in the order given :—portal lymph glands, liver tissue and the mediastinal and bronchial lymph glands. The lung tissue is sometimes involved and, of the regional lymph system, the axillary glands are most commonly affected. In a few cases the entire lymph glands of the body were tuberculous and calcification was not uncommon, a fact certainly pointing to infection before birth. A few individual cases are described ; one calf showed generalized tuberculosis and another showed lesions of the pleura and peritoneum, etc. Two lots of calf twins had identical lesions. The differentiation between the appearance of congenital tuberculosis and tuberculosis acquired by drinking affected milk is discussed.—J. E.

I. IYER, P. R. K. (1932). **Tuberculosis in Goats in India.**—*Ind. J. Vet. Sci. & Anim. Husb.* **11.** 41-48. 6 figs. on 2 plates. [4 refs.]

II. NAIK, R. N. (1932). **Tuberculosis in a Cow-Buffalo with a Review of the Disease in India.**—*Ibid.* 53-56. [5 refs.]

I. Iyer found six cases of tuberculosis in goats out of a total of 943 examined (0·63 per cent.). Although goats are known to be susceptible to tuberculosis this appears to be the first recorded instance of the disease in Indian goats. The usual tests proved the strain isolated to be of bovine origin.

II. As the bulk of the milk consumed in India is obtained from buffaloes, the incidence of tuberculosis in this species is of considerable practical importance. There is a wide variation in the results obtained by observers in different parts of the country. SOPARKER and DHILLON recently reported that, in cows, bullocks and buffaloes slaughtered at Lahore, tuberculous lesions were found in 22·85 per cent., whereas other observers put the incidence of the disease at a much lower figure.

Naik describes in detail the symptoms and lesions of tuberculosis in a cow buffalo.—T. M. DOYLE.

DUNDON, J. J. (1931). **Tuberculosis in Swine.**—*Vet. Rec.* **11.** 1097-1101.

The author describes in detail the lesions, and their frequency, of tuberculosis in swine based on the *post-mortem* examination of over 200,000 animals in the Irish Free State.

The symptoms exhibited by affected pigs are too indefinite to be of much diagnostic value. In the routine examination of pig carcasses, the first sites examined are the mesenteric, bronchial and submaxillary lymphatic glands. The glandular lesions may vary in size from that of a pin-point to the complete replacement of the normal tissue by caseous or calcified tuberculous material. In the lungs, the commonest lesions consist of caseous nodules, greyish white in colour, invisible on the surface, slightly elevated and showing little tendency to coalesce. In the liver, lesions vary from a few pin-head points, whitish or yellowish in colour, to the presence throughout the organ of innumerable nodules of fairly uniform size, which rarely coalesce to form large areas. In the spleen, lesions are relatively frequent and consist of sharply circumscribed nodules, elevated above the surface, and varying in size from that of a pin-head to a hazel-nut. In the kidney, lesions are usually rounded and small in size.

In the bony structure of the spinal column, lesions are comparatively common and consist of a tuberculous osteitis replacing the original structure in the bodies and processes of the vertebrae.

In Irish pigs the sites of infection in order of frequency are the mesenteric glands, submaxillary glands, bronchial glands, portal and gastric glands, spleen, kidney and spinal column.

Dundon believes that tuberculosis of swine in Ireland is chiefly of bovine origin and that it is transmitted almost entirely through the feeding of skim milk.
—T. M. DOYLE.

I. RUPILIUS, C. (1931). Ueber die Tuberkulose-Schutzimpfung mit B.C.G. (Nach Calmette). [Mit einem Vorwort von Prof. Franz Hamburger]. **[On Protective Inoculation against Tuberculosis with BCG (Calmette's Method) with Preface by F. Hamburger].**—Suppl. 1. *Arch. Kinderheilk.* pp. 56. 10 tables. [77 refs.]

II. RUPILIUS, C. (1931). Immunisierungsversuche gegen Tuberkulose (Calmette-Schutzimpfung ; Nachprufung des Tuberkulose-Schutzmittels

Tuberten). [**Experiments on Immunization against Tuberculosis (Calmette's Method ; " Tuberten ")**].—*Münch. med. Wschr.* **78.** 263-266. [6 refs.]

III. Rosenfeld, S. (1931). Die Hygienesektion des Völkerbundes und die Erfolgsstatistik der Calmetteschen Immunisierung. [**The Hygiene Section of the League of Nations and the Statistical Results of Calmette's Immunization**].—*Zschr. Tuberk.* **61.** 27-28.

I. Following a general discussion the author gives details of experiments on 32 guinea pigs which were given BCG in large doses (from 2 to 25 mg.) or in repeated small doses (from 0·01 to 0·3 mg.) and the results of the inoculation of 33 children with the same materials.

Amongst the conclusions are the following :—oral administration seems unreliable ; lesions following parenteral use were regressive and increase of virulence was never encountered ; local symptoms were lessened and the development of allergy hastened by the use of repeated small doses ; the tuberculin reaction following BCG is different in character and degree from that of spontaneous tuberculosis ; in the guinea pigs distinct protection against infection with small doses was shown by later or less severe development of lesions as compared with controls and in some cases by failure to infect ; repeated large doses gave a greater degree of protection ; allergy developed in most of the children. The author does not consider the time ripe for general adoption of BCG.

II. Similar to I, but refers to " Tuberten " [Beck. (1929). *Münch. med. Wschr.* **76.** 1082.] which Rupilius finds entirely indifferent as regards tuberculosis.

III. Rosenfeld stresses the fact that no statistics regarding BCG are yet in existence which satisfy the criteria laid down by the League of Nations in 1929.

—A. W. Stableforth.

Spring, W. J. (1931). **Experimental Joint Tuberculosis. I. An Attempt to Produce Localised Lesions in Guinea Pigs.**—*Amer. Rev. Tuberc.* **23.** 333-345. 1 table. [23 refs.]

A general infection with tubercle bacilli is not a fair test for any therapeutic measure now available as it would require a phenomenal curative agent to save the animal's life. An attempt was therefore made to produce a localized tuberculous infection under conditions as nearly standard as possible. A sensitizing dose of an avirulent strain of tubercle bacillus of human type was chosen to produce a state of allergy and the guinea pigs were tested with tuberculin both before and after such infection. A proportion of the animals received no further injections, but served to act as controls whilst the remainder received an injection of a measured dose of tubercle bacilli directly into the knee joint. Three different types of human tubercle bacilli of varying virulence were used and the dosage varied. The severity of the lesions produced appeared to depend more upon the virulence of the organism than upon the dose and an organism virulent enough to produce joint lesions of appreciable severity with regularity usually caused severe visceral tuberculosis. Because of this and because of the variation in the individual animals which were treated alike, the author considered the lesions produced to be of no value for therapeutic experiments.—R. Lovell.

Petroff, S. A., Steenken, W., Jr., & Winn, W. A. (1932). **Immunological Studies in Tuberculosis. VII. Resistance of Chickens Sensitised with Heat Killed and Living Avian Tubercle Bacilli.**—*J. Immunol.* **22.** 413-437. 10 figs. on 2 plates, 6 tables. [29 refs.]

In view of the prevalence of avian tuberculosis, the authors consider that, although there is no proof of mutation to human or bovine types and although

the avian bacillus is but rarely found in man, eradication is essential on epidemiological and economic grounds. They have attempted to procure an immunity by vaccination, using the dissociated " rough " and " smooth " colony types either killed by heat or alive. They found that the inoculation of heat-killed bacilli rendered chickens hypersensitive to the intradermal tuberculin test, especially when the R form of bacillus was employed. The inoculation of heat-killed S forms appeared to result in some degree of immunity, but as a number of the control fowls did not succumb to the experimental infection, the results were not conclusive.—NORMAN HOLE.

DOERR, R., & GOLD, E. (1932). Zur Frage der " Virulenz " der Tuberkelbazillen. **[On the " Virulence " of Tubercle Bacilli].**—*Zschr. Immun.-Forsch.* **74.** 7-24. 1 table. [17 refs.]

Five groups each containing seven guinea pigs were inoculated subcutaneously with minimal doses of human or bovine tubercle bacilli which had been subcultured on egg media for many years. Six animals of each group each received one bacillus and the remaining animal received ten bacilli, a micromanipulatory technique being used. Tuberculin tests were made four weeks later and the animals were killed after six weeks.

The injection of ten bacilli gave a positive result in the case of all five strains. The injection of one bacillus gave a positive result in the case of one guinea pig of each of these strains. The failure of one bacillus to infect in 25 out of 28 cases (2 died from intercurrent disease at 10 days) is believed to be due to the fact that the bacilli were in these cases dead or no longer in a condition to infect. The results show susceptibility of the guinea pigs to both human and bovine strains, but in the authors' opinion show that the course of artificial tuberculosis in guinea pigs is determined by the size of the dose, which dominates all differences of virulence (pathogenicity) between human and bovine strains. Guinea pigs of similar weight given the same dose show, however, individual differences in the speed with which the disease develops.

The question of the usual method of estimating virulence and of the varying reaction of human beings to bacilli of diverse virulence, according to dose and other factors, is discussed in the light of these experiments.—A. W. STABLEFORTH.

MARSH, H., WARREN, D. M., & MORROW, A. C. (1932). **A Study of the Tuberculin Sensitization in Cattle showing Subcutaneous Lesions.**—*J. Amer. Vet. Med. Ass.* **81.** 105-117. 4 tables.

Subcutaneous lesions are almost confined to milking cattle and usually occur on the teat. Although acid-fast bacilli can frequently be demonstrated in such lesions, and animal inoculation can occasionally set up lesions containing acid-fast bacilli, cultural efforts have proved fruitless and it is doubtful whether the organisms are really *Mycobact. tuberculosis.* Such subcutaneous lesion cattle, however, develop a varying and unstable degree of sensitivity to tuberculin injected intradermally. No reaction is provoked by subcutaneous or ophthalmic tests, neither do the results obtained from the use of avian tuberculin prove illuminating. It is worthy of note that, in a group of 257 tests when the intradermal inoculation was made in the vulva, only 6 atypical reactions were obtained against 49 in the caudal fold.

From the evidence submitted, these subcutaneous lesions do not appear to be able to resolve into internal tuberculosis, but whether they are a danger to the freedom of the herd from tuberculosis is not definitely established.

—NORMAN HOLE.

PLUM, N. (1931). Den bakteriologiske Diagnose af Uterustuberkulose hos Kvaeget samt Iagttagelser over Lidelsens Forekomst og Forløb. [**The Bacteriological Diagnosis of Uterine Tuberculosis in Cattle with Observations on the Occurrence and Course of the Disease. Parts I and II**].—*Maanedsskr. Dyrl.* **43.** 1-20 and 311-313.

[These papers are numbers 113 & 119 respectively of *Medd. Kgl. Vet.-og. Landbohojskoles Serumlab*].

In one year the laboratory received 588 samples of uterine secretion from 581 animals. 311 samples proved to be positive (53 per cent.): 260 of these were diagnosed microscopically, whilst 51 were detected by guinea pig inoculation.

The quality of the samples of uterine exudate sent in was very variable, some being too small to use for animal inoculation. Microscopic diagnosis was secured from direct smears. A few tests of making samples consisting essentially of homogenous mucus showed no better results than examination of direct smears.

In one case in which a new-born calf was found to be suffering from congenital tuberculosis, the uterus of the dam proved to be free from tuberculosis at an examination made one year afterwards and in the meantime the dam had given birth to a healthy calf. Other observations, together with the continued research work at the laboratory, seem to confirm that such an occurrence is by no means rare.

Cows with severe uterine tuberculosis do not always discharge tubercle bacilli in such numbers that they can be demonstrated microscopically or by means of inoculation.

In cases where there is not much exudate, the practitioner should massage the uterus thoroughly before taking the sample *per vaginam*. When infection is suspected a fresh sample should be forwarded if uterine tuberculosis is not diagnosed the first time.

The second paper [Part II] covered a period of a complete year following the first period. The same methods were employed and the corresponding figures are as follows [the figures for the first year are given in brackets]:—in the second year 718 samples were examined (588) in which a positive microscopic diagnosis was made in 328 cases (260); positive diagnosis by animal inoculation was obtained in 55 cases (51).

Of 127 cases of uterine tuberculosis diagnosed clinically, some 87 per cent. were confirmed (78); 82 cases of congenital tuberculosis in calves were observed (89) and tubercle bacilli were demonstrated in 78 of them (81).

It is concluded that the majority of cases of uterine tuberculosis in cattle can be diagnosed by laboratory methods.

These two articles contain much collected and original information on uterine tuberculosis of cattle. The results of the work reported in the first part are illustrated graphically in a table.—H. LORENZEN (DENMARK).

BALOZET, L., ZOTTNER, G., & DEVIRAS, M. (1931). Observations sur l'emploi de la tuberculine chez les bovidés et notamment sur les erreurs d'appréciations des réactions locales. [**Note on the Use of Tuberculin in Cattle with Special Reference to the Misinterpretation of Local Reactions**].—*Bull. Acad. vét. France.* **4.** 313-324. [1 ref.]

An attempt is here made to assess the relative value of different tuberculin tests in a herd of 129 cattle by applying the double ophthalmic and single intradermal methods and by controlling the interpretation of the reactions, in the first place by the subcutaneous test and secondly by a *post-mortem* examination of some of the animals. The second ophthalmic dose was instilled on the evening of the third

day after the sensitizing dose, the intradermal inoculation having been made in the morning. The dose was 0·1 c.c. of a concentrated tuberculin diluted 1 : 4, the reactions being read the following day. Individual observations were undertaken by each of the three operators in order to determine the degree to which the personal factor entered into the interpretation of the results.

These were tabulated according to whether there was complete accordance of the three observers, or whether there were divergent opinions on the results of the ophthalmic, intradermal and both tests respectively. It is noted that, out of 63 cases classified as positive, there was complete agreement to both tests in 25 cases only (39·6 per cent.). The observers were in agreement in connection with 51 per cent. of the ophthalmic tests and 77 per cent. of the intradermal tests.

One month later the herd was tested subcutaneously : there were 68 positive, five doubtful and 56 negative reactions. In 96 per cent. of the ophthalmic and 87 per cent. of the intradermal tests, the results of the local tests were confirmed by the subcutaneous method, while in the case of many of the individuals in which there were doubtful reactions to the local tests, positive reactions were obtained to the subcutaneous test. There were three instances of negative reactions to the local tests which were positive to the subcutaneous test : *post-mortem* examination revealed tuberculosis in one case and no lesions in another, while the third had been vaccinated with BCG. On the other hand, 14 animals reacting to local tests failed to react to the subcutaneous test. Four were killed : two were tuberculous and in two there were no visible lesions. [No distinction is drawn between possible differences in the reliability of the ophthalmic and intradermal tests].

The authors are of the opinion that, in view of the wide disagreement in the interpretation of the local reactions, the results should always be confirmed by the subcutaneous test.—R. E. GLOVER.

LOVELL, R. (1932). **The Salmonella Group of Bacteria.**—*Bull. Hyg.* **7.** 405-415. 3 tables. [56 refs.]

A summary of the main characters of the group is given, followed by a discussion of the fermentation reactions which help to differentiate the various species.

The antigenic structure of normal forms and variations of this structure, e.g. the group-type change of ANDREWES, the α and β variation of KAUFFMANN and MITSUI, the non-motile O variant and the S to R variations are then discussed briefly. The studies by WHITE and other British authors on the analysis of the various members of the salmonella group are compared with the studies of the authors KAUFFMANN and MITSUI, and the equivalent symbols and figures used by the two schools are given in tabular form.

The history and relationship of many important species pathogenic for man and animals is given.

The author finally describes the methods employed in the study of an unknown bacterium, emphasizing the importance of complete cross-absorption agglutination tests, the testing of the absorbed sera for both H and O agglutinins and the separate examination of type and group phases in the case of diphasic bacteria.—C. McG.

BOSWORTH, T. J., & LOVELL, R. (1931). **The Dublin Type of Salmonella as a Cause of Disease in Calves.**—*2nd Rep. Direct. Inst. Anim. Path. Univ. Cambridge.* pp. 21-28. 5 tables. [24 refs.]

The Dublin type of salmonella, which in man may cause food poisoning, meningitis or continued fever with septicaemia, and which has been shown to be a cause of calf dysentery in Denmark, has been isolated from two outbreaks of

disease in calves in Great Britain.

The first outbreak was observed in a batch of 20 calves about two weeks old recently purchased by the Institute concerned. Three days after purchase several were ill and soon all were affected ; 18 died within 4 to 14 days, and 2 quickly recovered. The symptoms and *post-mortem* findings were those of a septicaemia and included high fever, acute diarrhoea and in some cases pneumonia. In acute cases a salmonella was isolated regularly from blood, lungs, liver, spleen, mesenteric glands, and intestinal contents. A few months later the disease was again observed in a batch of 10 calves purchased from the same source ; of 10 affected animals, 8 died.

The second outbreak occurred on a farm among recently purchased three weeks old calves and spread to other home-bred young stock ; pneumonia was the predominant condition, intestinal involvement being absent. There were 17 cases with 2 deaths.

The strains isolated in these outbreaks were agglutinated to titre by sera prepared against *Bact. enteriditis* or " Dublin " (another member of the same subdivision of the salmonella group), but absorption tests carried out with these sera and with a serum prepared against one of the calf strains left no doubt that they were of the Dublin variety.

The outbreaks corresponded almost exactly to the description of salmonella infection given by workers in other countries. It is recalled that SMITH and SCOTT pointed out in 1930 that, in the majority of cases in which the Dublin type had been isolated from man, milk could be definitely suspected, and that this, coupled with the fact that certain strains from calf dysentery in Denmark (apparently *Bact. paracoli* Jensen, 1913) were of the Dublin type, suggested that the Dublin type is of bovine habitat and that cows' milk is the vehicle of infection.

—A. W. STABLEFORTH.

MARTINAGLIA, G., & ROBINSON, E. M. (1932). **An Outbreak of Paratyphoid in Pigs.**—*J. S. Afric. Vet. Med. Ass.* **3.** 79-80.

The authors record the existence of infection of pigs in South Africa with a member of the salmonella group. The disease was encountered in the abattoirs and the lesions present included a hyperaemia of the skin, haemorrhagic lymphatic glands, slight pulmonary oedema, enlarged dark spleen and a mucoid enteritis. The observations were confined to six pigs and samples of blood and tissues were examined. Virus conditions were excluded by inoculation of filtrates. The causal organism appeared to be a member of the salmonella group and is stated to be *Bact. suipestifer*, although full proof of identification is not given ; neither is the variety of *Bact. suipestifer* determined. One test pig, inoculated intravenously with 5 c.c. of a living suspension, died within about 48 hours ; another receiving 100 c.c. of culture *per os* showed no symptoms.—R. LOVELL.

DURANT, A. J. (1932). **A Comparison of Three Methods of Testing for Pullorum Disease with Finer Interpretations of Readings on the Old Tube Agglutination Test.**—*J. Amer. Vet. Med. Ass.* **81.** 37-45. 1 fig., 1 table. [3 refs.]

In view of the recent introduction of new methods of pullorum testing, the author has made a comparative test on an infected flock of 259 birds, and checked up his results by cultural examination of the ovaries of all positive reactors. The old macroscopic tube test, a rapid serum test and the rapid whole blood test with a stained antigen were the methods compared. In the author's hands the old tube test gave the best results, picked out the most positive reactors and conformed most nearly to the bacteriological findings. He found, moreover, that the practice

of condemning doubtful reactors to this test as positive is amply justified. The rapid serum method gave the next best results. He suggests that until the rapid method has proved more accurate it should not, in the interests of pullorum disease eradication, be allowed to replace the old tube agglutination test.

—NORMAN HOLE.

I. BRUNETT, E. L. (1931). **Transmission of Bacterium Pullorum Infection among Mature Chickens. II.**—*New York State Vet. Coll. Bull.* No. 18. pp. 114-116. [2 refs.]

II. TITTSLER, R. P. (1932). **Pullorum Disease in Poults.**—*Poultry Sci.* **11.** 78-80. [8 refs.]

III. VACCARO, H. (1932). Infection des Poules à *Bacillus pullorum* au Chili. [*Bact. pullorum* **Infection of Hens in Chili**].—*C. R. Soc. Biol. Paris.* **110.** 629-630.

I. Two groups of birds were employed for this experiment and examined over a period of nine months. In one pen 13 reacting females, 12 non-reacting females and 2 non-reacting males gave no evidence of transmission.

In the second pen, which contained 14 reactors and 14 non-reactors without males, the infection was found to have spread to one bird. It has previously been recorded that infection did not spread until males were introduced, but no evidence was found that the male is necessary for the spread of infection.

II. *Bact. pullorum* infection is reported in two three-day-old poults. Liver and lung lesions were found in one bird and in the other no lesions were recorded. There were about 300 poults in the diseased group and the total mortality during the epidemic was about 20 per cent.

This evidence points to the incubator as the source of infection as no signs of the disease were noted in either of two other groups from the same breeder. It is not stated whether the blood of the parent stock was tested for *Bact. pullorum* infection. There were no chickens on the farm.

III. A description is given of the isolation of five strains of *Bact. pullorum* from Rhode Island Red birds, of the microscopic and cultural characteristics, and fermentation reactions. The inoculation subcutaneously or intraperitoneally of 0·25 c.c. of a 24-hour broth culture killed young chickens in from one to two days.—NORMAN DOBSON.

RETTGER, L. F., & PLASTRIDGE, W. N. (1932). **Pullorum Disease of Domestic Fowl.**—*Storrs Agric. Expt. Sta. Bull.* No. 178. pp. 107-192. 7 figs., 2 plates, 11 tables. [7 pages of refs.]

Storrs Agricultural Experiment Station was one of the first institutes to undertake research into pullorum disease, as it is now almost universally named in the United States, and the purpose of this bulletin is to embody in monograph form the essentials of up-to-date knowledge of the disease.

It is set out in two parts under numerous headings and appears to be very comprehensive, including sections on the early history of the disease and a systematic account of it. Diagnostic methods are described in detail. Voluntary eradication under a system of state legislation, based on the results of the agglutination test, has been in operation in Connecticut since 1925 and the results have been very successful. The object is to build up " accredited " (disease free) flocks.

The bibliography is practically confined to publications of American and British authors and, with few exceptions, the material information discussed is of American origin. The monograph is thus a valuable summary of American work.

—J. E.

EMMEL, M. W., & BOEVERS, M. L. (1932). **The Differentiation of Pasteurella avicida and Brucella Infections in the Fowl.**—*J. Amer. Vet. Med. Ass.* **81.** 92-104. 2 figs. on 1 plate, 4 tables. [13 refs.]

The authors confirm the findings of MALLMANN (1930) that members of the brucella and pasteurella genera are interagglutinable, but they find that, in experimental infection of the fowl, whilst the antibody producing power of *P. avicida* is low, that of the brucella group is quite high. A positive brucella agglutination test is of value in determining brucella infection in the fowl and the disease can be distinguished from *P. avicida* infection on clinical, bacteriological and histopathological grounds.—NORMAN HOLE.

WILSON, G. S. (1931). **The Brucella Group.**—*Bull. Hyg.* **6.** 389-394. [34 refs.]

This is an excellent summary of the knowledge then in existence of the methods of differentiation applied to distinguish the various types of brucella. The methods and their value are described, but it is emphasized that reliance should never be placed upon one method alone and that all tests should be carried out on recently isolated strains. Habitat may give useful information as to the probable type of brucella. Cultural characteristics are not of any great value for differential purposes, although some authors hold that porcine strains grow more rapidly than bovine strains and these more so than *melitensis* strains. Bovine strains of brucella when freshly isolated require from 5 to 10 per cent. carbon dioxide for their development, whilst neither the porcine type nor *Br. melitensis* require any extra supply of carbon dioxide. Most strains of bovine *abortus* grow aerobically after laboratory cultivation. Although there is an undoubted variation in the amount of glucose utilized by various strains, the author doubts its value as a means of classifying individual strains. Too much reliance cannot be placed upon the production of hydrogen sulphide when grown on liver agar slopes for differential purposes, although in general it appears as if the *abortus* strains produce hydrogen sulphide and the *melitensis* strains produce only a slight amount or none at all.

The bacteriostatic action of dyes is of importance for differential purposes if due care is taken in the test. The dyes mentioned and their concentrations are thionin and basic fuchsin in a concentration of from 1 : 25,000 to 1 : 50,000, and methyl violet, 1 : 100,000. After incubation for 72 hours it is found that bovine *abortus* strains grow only on the medium containing basic fuchsin or methyl violet ; porcine *abortus* strains grow only on the medium containing thionin ; *melitensis* strains grow on all three. [Serological methods have up to the publication of this article proved of little value in differentiation although articles published since have cleared up certain discrepancies. See PANDIT & WILSON. (1932). *J. Hyg. Cambridge.* **32.** 45, and WILSON & MILES. (1932). *Brit. J. Exp. Path.* **13.** 1].

It appears that subcutaneous inoculation of guinea pigs with small doses of the varying types may indicate slight differences. In general it is probable that porcine *abortus* strains are the most virulent, and bovine *abortus* strains the least virulent, *melitensis* occupying an intermediate position.—R. LOVELL.

I. MITCHELL, C. A. (1931). **Bovine Infectious Abortion or Bang's Disease of Cattle.**—*Canad. Dept. Agric. Bull.* No. 150. pp. 15. 3 plates.

II. GLOVER, E. K. (1932). **Observations on Bang's Disease.**—*Vet. Med.* **27.** 374-378. 1 table.

I. This bulletin is a concise review of the present position regarding contagious abortion and is written for the benefit of farmers. It contains no original matter.

II. The author reports the successful results of vaccination against abortion

in five herds in which the abortion rate was markedly reduced after the administration of living organisms. The injection of avirulent organisms into pregnant animals is said to produce a high degree of protection.—S. J. EDWARDS.

SUZUKI, S. (1931). **Biological Studies of Abortion Bacilli with Special Reference to the Identification of the Bacilli and** *Bacillus paratyphosus B.*—*J. Jap. Soc. Vet. Sci.* **10.** 68-81. 1 fig., 6 tables. [4 refs.] [Orig. in English].

Suzuki studied the reactions of *Bact. paratyphosum* B and *Bact. abortus equi* in various carbohydrate media. He found that the two organisms could be readily distinguished by the difference in their reducing powers on peptone broth containing 4 per cent. starch with methylene blue added as an indicator.—T. M. DOYLE.

I. BANG, O., & BENDIXEN, C. (1931). Die Anzahl der Abortusbakterien in Milch von Kühen die verworfen haben. [**The Number of Abortion Bacteria in Milk from Cows that have aborted**].—*9th Internat. Dairy Congress. 2nd Section.* pp. 117-129. German edition.

II. WOOD, D. R., & ILLING, E. T. (1931). **Investigation of the Occurrence of** *B. abortus* **(Bang) in the Milk of English Herds (County of Somerset).**—*Analyst.* **56.** 105.

I. The number of *Br. abortus* organisms in the milk of naturally infected cows varies from a few to many thousands per c.c. Even in milk containing 30,000 bacteria per c.c. no visible alteration was observed. It was shown by examination of the individual quarters of the udders of 11 cows that *Br. abortus* was excreted by 31 quarters and in 11 of these it was present in pure culture.

II. Wood and Illing tested a composite sample of milk from each of 379 dairy herds by guinea pig inoculation and in four samples *Br. abortus* was demonstrated.—T. M. DOYLE.

VIOLLE, H. (1931). Des possibilités de transmission de la fièvre ondulante par les oiseaux. [**The Possible Transmission of Undulant Fever by Birds**].—*Bull. Acad. Méd. Paris.* **105.** 216-218.

Violle states that it is frequently difficult to trace the origin of brucella infections in man on account of the variety of the species of animals (sheep, goats, cattle, horses, pigs, dogs, cats and fowls) which may harbour and transmit the causal organism. He has shown that, when pigeons are inoculated intramuscularly with cultures of *Br. abortus*, the organism can be recovered seven days later from the heart blood, liver and spleen. Similar results were obtained with chaffinches and thrushes.—T. M. DOYLE.

I. SEN, M. R. (1932). **Bacillary Necrosis or Necrotic Dermatitis in Horses.**—*Ind. Vet. J.* **9.** 128-130.

II. BLACKWELL, W. E. (1932). **Acute Bacterial Necrosis of the Bovine Liver.**—*Vet. Rec.* **12.** 1435-1436.

I. In this article the author summarizes his observations on several such cases. He describes briefly the characters of the causal organism (*Actinomyces necrophorus*) and details the symptoms associated with the condition, which he describes as an acute inflammatory disease affecting the extremities. Mild cases occur and mixed infections are common.

A method of treatment found by the writer to be successful is also described.

II. This is a clinical account in which the history, symptoms and course of the disease in a three-year-old steer are given. The writer points out that the only prominent symptom during the four days' observation was a temperature

which fluctuated from 107·6° to 105·2° F. The animal was slaughtered and revealed necrotic lesions in the liver and acute inflammation of a small portion of the bowel, the probable site of bacterial invasion.

He concludes by remarking on the prevalence of the condition in that particular locality during the autumn of 1932 and attributes it to the previous wet seasons.

—GWILYM O. DAVIES.

DISEASES CAUSED BY PROTOZOAN PARASITES.

BASSET, J., & AUGER, L. (1931). Piroplasmose vrai du cheval (*P. caballi*) dans le Sud-Est. [**True Equine Piroplasmosis in the South-Eastern Districts**].—*C. R. Soc. Biol. Paris.* **107.** 629-631.

The authors record that they encountered true equine piroplasmosis in France in the departments of Ain, Loire and Saône-et-Loire. The cases seen were severe ; it is probable that veterinary assistance is not sought for mild cases. The symptoms were fever, weakness, jaundice and oedema of the breast, sometimes of the limbs. The urine was turbid but not red. Out of 13 cases, 9 deaths occurred within three to six days.

The incubation period in experimental cases varied from four to six days ; one animal died and one recovered. Eight cases were treated with trypan blue and all recovered. The author thinks that the infection must be new in this area as old horses, bred locally, contract the disease.—U. F. RICHARDSON.

LÖNDBORG, G. (1931). Om behandling av kycklingcoccidios. Några försök. [**On Coccidiosis in Chickens. Some Experiments**].—*Skand. Vet.-tidskr.* **21.** 360-368. 4 tables.

" Ferro lactate " added to the drinking water in the proportion 0·5 per cent. was of no use for the cure of coccidiosis in chickens. If affected birds are kept in the dark and so forced to rest, at least some improvement in the condition usually follows provided that the treatment is not carried to excess.

—N. LAGERLÖF (STOCKHOLM).

I. BECKER, E. R., & CROUCH, H. B. (1931). **Some Effects of Temperature upon Development of the Oocysts of Coccidia.**—*Proc. Soc. Exp. Biol. New York.* **28.** 529-530. 1 table. [1 ref.]

II. FISH, F. F. (1932). **Some Factors in the Control of Coccidiosis of Poultry.**—*J. Amer. Vet. Med. Ass.* **80.** 543-559. 7 tables, 2 graphs.

I. The experiments described were carried out with the chicken coccidia *Eimeria magna* and *E. perforans*. The optimum temperature for sporulation was found to be 33° C. in both species and both were rendered incapable of further development by exposure at a temperature of 51° C. for ten minutes, but not at 50° C. At lower temperatures marked differences were noted in the percentage of oocysts rendered sterile in the two species.

II. This article is part of a thesis and contains much valuable scientific data upon the behaviour of oocysts of coccidia, with special reference to those of *E. tenella*. Making use of available information, the author discusses the possibility of discovering or evolving successful treatment for avian coccidiosis and then proceeds to record experiments in which he attempted to find a vulnerable part of the parasite's life cycle.

Unsegmented oocysts were exposed to the action of a large variety of chemical reagents and disinfectants. The result was expressed in terms of the percentage

of oocysts which were rendered incapable of development, corrections being made for the natural mortality not due to the reagents. Iodine suspensoid caused complete mortality in one hour, cresol (2 and 5 per cent.) in 12 hours and creosote oil in 24 hours. Phenol (2 per cent.) caused only a 60 per cent. mortality in 24 hours, but phenol (5 per cent.) caused a 93 per cent. mortality in 6 hours. Hydrochloric acid, even up to a concentration of 2 N, set up a negligible mortality.

Extensive experiments were carried out to determine the resistance of segmented and unsegmented oocysts to moist heat. Unsegmented oocysts, in a known concentration, were exposed at different temperatures for a fixed time, namely ten minutes. The result was arrived at by counting the number which subsequently segmented when left in potassium bichromate solution at room temperature. It was found that 54° C. was the lowest temperature which would cause complete mortality. Segmented oocysts were similarly exposed and the effects estimated by feeding the heated oocysts to susceptible chickens ; 54° C. was again found to be the critical temperature.

Unsegmented oocysts were rendered completely incapable of further development and segmented oocysts failed to infect after exposure for 15 seconds at 60° C. or 5 seconds at 80° C. The exposure necessary rapidly diminished with increasing temperatures.

Segmentation failed to occur at 41° C., but this temperature appeared to have no deleterious effect upon the oocysts and it is suggested that this offers a better explanation of their failure to develop in the host than the theory generally held that oxygen is necessary for segmentation.

The effect of ultra-violet rays was investigated by exposing about 200 oocysts, suspended in water on a coverslip, to a quartz mercury arc lamp. Two zinc sulphide units (Clark, 1929) killed both segmented and unsegmented oocysts.

The author remarks that coccidial oocysts, although highly resistant to chemical agents, are less resistant to physical agents than is supposed and concludes that, in the control of avian coccidiosis, more attention should be paid to the destruction of the oocysts and the general vigour of the host, as these appear to be more important than the possibility of developing a specific immunity.

—R. S. Roberts.

Skidmore, L. V. (1932). **Leucocytozoon Smithi Infection in Turkeys and its Transmission by Simulium occidentale Townsend.**—*Zlb. Bakt. I.* (*Orig.*). **125.** 329-335. 4 figs. [12 refs.] [Orig. in English.]

A brief review of the literature on *Leucocytozoon smithi* infections in birds is given, followed by a description of an outbreak of disease in young turkeys in Nebraska, U.S.A.

Of a flock of 385 birds, all except 40 died in the course of four months. Blood films of the survivors showed numerous *L. smithi.* No parasites were seen in the blood of chickens, ducks and geese which had remained healthy. The symptoms were loss of appetite, emaciation, drowsiness, convulsions, coma and foamy discharge from the mouth and nostrils. The lesions were yellowish discolouration of the flesh, cyanosis of the head, enlargement of the spleen and congestion of the duodenum. Lesions of blackhead were found in 4 of 30 examined.

Attempts to transmit the disease by feeding infected material to healthy turkeys were unsuccessful, as were also inoculations of blood and bone-marrow containing parasites and injections of ground-up lice (*Eomenacanthus stramineum* Nitsch) and flies (*Stomoxys calcitrans*) obtained from infected birds. Healthy birds placed in contact with infected birds did not contract the disease.

Specimens of *Simulium occidentale* Townsend, which had fed on infected

turkeys were caught, ground-up in saline solution and injected intravenously into two young turkeys. Leucocytozoa appeared in the blood in 12 days and one bird died.

The author claims that the latter experiment is the first definite proof that *L. smithi* may be transmitted by an intermediate host.—C. McG.

HOARE, C. A. (1932). **On Protozoal Blood Parasites collected in Uganda. With an Account of the Life Cycle of the Crocodile Haemogregarine.**—*Parasitology*. **24.** 210-224. 56 figs. [17 refs.]

This paper deals with the blood protozoa obtained from 31 species of animals in Uganda :—fish 5 ; amphibia 1 ; lizards 3 ; crocodile 1 ; snakes 9 ; tortoise 1 ; birds 4 and wild mammals 7. The parasites found included trypanosomes, haemogregarines, leishmania and plasmodia.

An account is given of the life history of the crocodile haemogregarine in the crocodile and in *Glossina palpalis*, the intermediate host.—U. F. RICHARDSON.

I. MACHATTIE, C., MILLS, E. A., & CHADWICK, C. R. (1931). **Naturally occurring Oriental Sore of the Domestic Cat in Iraq.**—*Trans. Roy. Soc. Trop. Med. Hyg. London.* **25.** 103-106. 6 figs. on 1 plate. [3 refs.]

II. MILLS, E. A., MACHATTIE, C., & CHADWICK, C. R. (1931). **The Rieckenberg Reaction as an Aid to Diagnosis in Chronic and Aberrant Types of Oriental Sore.**—*Ibid.* 205-208. [1 ref.]

I. While cats are not kept in large numbers in the towns and villages in Iraq, they are sufficiently numerous to be an important potential reservoir of the parasite of oriental sore. Recorded cases of natural infection in cats are very few in number. In this paper, the authors publish details of two cases from Baquba, about thirty miles from Baghdad.

The lesions involved the nose and ears and parasites were found in them. Cultures were readily obtained and subcultured. *Post-mortem* examination failed to reveal any evidence of visceral or bone-marrow infection. Sections from the lesions showed intense infiltration of the tissues around and beneath the ulcers with macrophages. These were packed with parasites. Perivascular plasma-cell infiltration was a marked characteristic of the lesions. No giant cells were found.

An attempt to infect four white mice with one of the strains recovered failed.

II. The Rieckenberg reaction is the attraction produced between blood-platelets and trypanosomes when a mixture is made containing blood from an animal cured of trypanosomiasis, blood containing the same species of trypanosome and citrated bouillon.

In applying this test to old lesions suspected of being due to infection with leishmania, the authors find that it is necessary to use strains of the parasite which have been subcultured for some time, as recently recovered strains form rosettes spontaneously and hinder the reaction because the flagella are not free for the adhesion of the platelets. The mixture is allowed to stand in a watch-glass in which it is made for two or three minutes and moist preparations are then examined under the microscope. The parasites can be observed to move toward the blood platelets which become attached to the flagellum. From 20 to 30 may be so collected and they appear to exert a lethal action on the flagellates which become surrounded by phagocytes and are finally ingested by these.

Infected and non-infected dogs gave positive and negative results. Four suspected cases in human beings have been subjected to the test, positive results being obtained in three and a doubtful result in the fourth. The blood of recently

arrived Europeans used as negative controls gave negative results.

—A. Leslie Sheather.

Salle, A. J. (1931). **The Metabolism of Protozoa. II. A New Solid and a New Liquid Medium for the Cultivation of Leishmania donovani.**—*J. Infect. Dis.* **49.** 473-480. [24 refs.]

Salle, A. J. (1931). **The Metabolism of Protozoa. III. The Metabolism of Leishmania donovani.**—*Ibid.* 481-484. [16 refs.]

For the growth of *Leishmania donovani* on solid media the addition of 15 per cent. blood is required ; whole blood defibrinated or citrated must be used. Various peptones were tested, but the organism exhibited no special preference for any variety. Two per cent. peptone appeared to be the optimum concentration and Salle now recommends the following media :—

Solid medium :—Peptone 20 g. ; beef infusion 250 c.c. ; sodium chloride 6 g. ; agar 15 g. ; distilled water 830 c.c. ; reaction pH 7·2. After sterilization add 2 c.c. of a 50 per cent. dextrose solution and 15 c.c. blood to each 83 c.c.

Liquid medium :—Peptone 20 g. ; beef infusion 250 c.c. ; sodium chloride 5 g. ; dextrose 10 g. ; distilled water to make 550 c.c. ; haemolysed rabbit blood (1 : 3) 450 c.c.

The second paper deals with the chemical alteration of media by *L. donovani* in the presence or absence of dextrose and the author considers that the organisms prefer a medium rich in carbohydrate.—U. F. Richardson.

I. Dikshit, B. B., & Rao, D. K. (1931). **Antimony Test for Kala-Azar.**—*Ind. J. Med.* **12.** 264-267. 1 table. [3 refs.]

II. Giraud, P. (1932). Sur l'origine canine du kala-azar méditerranéen. [**The Canine Origin of Mediterranean Kala-Azar**].—*Bull. Soc. Path. exot.* **25.** 558-561.

I. The authors set out to ascertain whether the antimony test for kala azar gave positive results in non-kala azar subjects in a non-endemic area. The test was carried out by pricking a finger and inverting a small tube containing 2 per cent. potassium oxalate over the prick. The blood drop was washed into the oxalate and then 4 per cent. stibamine urea was added slowly. A positive result is judged by the formation of a precipitate. Four positive results were given by 100 subjects and one of these four proved to be suffering from kala azar. Of the remaining three, two were fever cases and one was suffering from dog bite. Negative results were given by cases of malaria, leprosy, tuberculosis and subjects with enlarged livers and spleens.

II. Canine leishmaniasis was recognized in Marseilles some years before the disease was diagnosed in human subjects. Since then the human disease has become much more prevalent, but the canine disease is comparatively rare. The author examined 117 dogs by spleen puncture or autopsy without detecting leishmania. Some of the human cases occur in circumstances where any close connection with dogs can be excluded, but on the other hand the disease is far more prevalent in the suburbs and along the sea front, where dogs are kept, than it is in the centre of the town. In some human cases it is found that, although no contact with canines is apparent, enquiries reveal that a dog suffering from sores has lived in the house and been destroyed. In other cases contact with dogs does exist, but no disease can be detected in the animals concerned.

—U. F. Richardson.

Lwoff, Marguérite. (1932). Nature de la substance du sang indispensable à la

nutrition de *Leptomonas ctenocephali* Fantham. **[The Nature of the Substance in the Blood Essential to the Nutrition of *Leptomonas ctenocephali* Fantham].**—*C. R. Soc. Biol. Paris.* **110.** 891-893. [3 refs.]

The author cultivated *Leptomonas ctenocephali* satisfactorily in peptone water, to which haematin had been added in proportions varying from 1 : 4,000 to 1 : 40,000, and concludes that the substance required is the active iron factor X, one of the substances also required by *Haemophilus influenzae*.

—U. F. RICHARDSON.

DISEASES CAUSED BY FILTRABLE VIRUSES.

I. ELFORD, W. J. (1931). **A New Series of Graded Collodion Membranes Suitable for General Bacteriological Use especially in Filterable Virus Studies.**—*J. Path. & Bact.* **34.** 505-521. 3 figs., 3 tables. [6 refs.]

II. ELFORD, W. J., & ANDREWES, C. H. (1932). **The Sizes of Different Bacteriophages.**—*Brit. J. Exp. Path.* **13.** 446-456. 4 tables, 2 charts. [20 refs.]

III. —. (1932). **The Nature and Size of Virus Particles.**—*Lancet.* **223.** 1285. [3 refs.]

I. A new series of graded ultrafilter membranes suitable for general bacteriological use is described. The principles and technique of membrane preparation are discussed in detail. The advantages which they possess over filter candles are their superior uniformity, graded porosities, low specific adsorption value and elimination of cleaning treatment. The method of preparation of the membranes requires much careful attention in order to ensure consistent results. The antagonistic solvent action between amyl alcohol and acetone is utilized to bring about a progressive aggregation of nitro-cellulose particles during the evaporation period in the process of membrane formation. The variation in the permeability of the membranes prepared from celloidin and necol (a standardized collodion) is brought about by definite increments in water or acetic acid content according to whether a membrane of greater or lesser permeability than that of parent stock collodion is desired. The finer intermediate grades of membrane are obtained by varying the evaporation period. Thus a wide range of permeabilities from A.P.S. (average pore diam.) 3μ down to A.P.S. $10\mu\mu$ or less becomes available. Membranes prepared in this way may be sterilized by steaming in distilled water in pyrex beakers without appreciably altering their properties for filtration work. The membrane is supported on a perforated plate and filtration conducted under positive pressure [for technique see ELFORD, W. J. (1929). *Brit. J. Exp. Path.* **10.** 126]. Using *Chromobacterium prodigiosum* as test organism all membranes of calculated A.P.S. less than $0{\cdot}75\mu$ have been found to retain the organism completely. Membranes of an A.P.S. less than $0{\cdot}75\mu$ and greater than $0{\cdot}2\mu$ allow the organism of bovine pleuro-pneumonia to pass while *Chromobact. prodigiosum* is effectively retained. Over the range of membrane permeability A.P.S. $0{\cdot}2\mu$ to $65\mu\mu$ bacteriophage (*coli*) passes. Oxyhaemoglobin passes all membranes of A.P.S. greater than $10\mu\mu$.

[The membranes have now been used for the study of the filtering properties of the following viruses and the relative size of the respective virus particles has been estimated as follows :—(1) Foot and Mouth Disease $8–12\mu\mu$. GALLOWAY, I. A., & ELFORD, W. J. (1931). *Brit. J. Exp. Path.* **12.** 407 ; (2) Infectious Ectromelia of Mice $0{\cdot}1–0{\cdot}15\mu$. BARNARD, J. E., & ELFORD, W. J. (1931). *Proc. Roy. Soc. Ser. B.* **109.** 360 ; (3) Vaccinia $0{\cdot}125–0{\cdot}175\mu$. ELFORD, W. J., &

ANDREWES, C. H. (1932). *Brit. J. Exp. Path.* **13.** 36 ; (4) Herpes 0·1–0·15μ. ELFORD, W. J., PERDRAU, J. R., & SMITH, W. (1932). *J. Path. & Bact.* **36.** 49. In these papers information is also given with regard to filtration technique—see especially (2)—and to various fundamental filtration phenomena—see especially (1)].

II. The sizes of a number of bacteriophages have been estimated by the help of graded collodion membranes [see above]. Different phages appear to differ from one another in size. The estimated diameter of the smallest phage studied (S 13) is 8–12$\mu\mu$, the same as that of the smallest known virus—that of foot and mouth disease—and that of the largest is probably between 50 and 75$\mu\mu$. The conclusions as to the relative sizes of three phages estimated by filtration experiments have been confirmed by diffusion experiments. A relationship has been found to exist between the size of a phage and the size of plaque produced by it. Small phages tend to give rise to large plaques on agar and conversely. No evidence of change in the size of phages, as a result of a process of purification by electrodialysis or washing, was obtained.

III. This article refers to the work described in I and II.

—I. A. GALLOWAY.

I. SINCLAIR, J. M. (1931). **Foot and Mouth Disease.**—*Rhodesia Agric. J.* **28.** 829-830.

II. —. (1931). **Foot and Mouth Disease.**—*Ibid.* 944-945.

III. SINCLAIR, J. M. (1931). **Foot and Mouth Disease.**—*Ibid.* 1044-1045.

IV. BEVAN, Ll. E. W. (1932). **Foot and Mouth Disease : Some Peculiarities presented by the Disease in Southern Rhodesia.**—*Vet. J.* **88.** 98-107.

V. BEVAN, Ll. E. W. (1932). **Foot and Mouth Disease in Southern Rhodesia and a Method of Emergency Inoculation.**—*Trans. Roy. Soc. Trop. Med. Hyg. London.* **26.** 89-93.

I. Report of the Chief Veterinary Surgeon giving the state of the outbreaks to August 22nd, 1931.

II. List of restrictions imposed by the Government of Northern Rhodesia on commodities in transit to the Congo.

III. Report of the Chief Veterinary Surgeon giving the state of the outbreaks in September, 1931.

IV. The author describes the disease, as it occurs in Southern Rhodesia, as exceptionally mild, causing so little disturbance that in many outbreaks it has died out, leaving it uncertain as to whether the majority of the animals have ever been infected, but he does not state if any such cattle were tested for immunity. He considers it probable that many animals contract the disease in an occult form, showing elevation of temperature, but without " open " lesions. In all cases outbreaks have been traced to infected cattle coming in contact with healthy stock. There appear to have been no cases of human beings, horses, wild animals, etc., carrying the disease from place to place.

Natural infection took place quickly only when infected cattle were placed in kraals with healthy susceptible animals and head to head contact was possible.

He found that the best means of artificially infecting animals was by introducing infective material into the nasal cavities of susceptible cattle. It is considered that the virus found in Southern Rhodesia appears to be of very low infectivity and difficult to transmit. The viability of the virus outside the animal body appears to be exceptionally brief.

V. The author briefly describes the following three suggested methods of control :—(a) use of a standardized virus issued to veterinary officers in the field ;

(b) blood collected from reacting animals was injected into the nostrils of other animals and when these reacted, blood was collected and stored. If the animals only showed a mild reaction the bloods stored in the bottles were pooled and 2·5 c.c. amounts were injected into each nostril of the animals to be inoculated and (c) sick and healthy animals were placed in close proximity, for head to head contact. The best results were obtained from a combination of (a) and (c). No details are given of the preparation of the standardized virus as used in (a).

—NORMAN DOBSON.

ARKWRIGHT, J. A. (1932). **Recent Research in Foot and Mouth Disease.**—*J. Min. Agric. London.* **38.** 1207-1215.

The chairman of the Foot and Mouth Disease Research Committee [Great Britain] briefly outlines the progress of research since 1892, when the virus was discovered by LÖFFLER and FROSCH.

Most of the succeeding portion of the article deals with the results of work published in the Committee's Fourth Progress Report which has already been dealt with [see this *Bulletin.* **2.** 78, 141, 144, 145 and 212].—NORMAN DOBSON.

FORTNER, J. (1932). Ueber Virusträger und echte Dauerausscheider bei Maul- und Klauenseuche. [**On Carriers and Genuine Virus Excretors in Foot and Mouth Disease**].—*Deuts. tierärztl. Wschr.* **40.** 183. [4 refs.]

The author stresses the importance of WALDMANN's work in which he demonstrated the occurrence of virus carriers among recovered cattle [see this *Bulletin.* **1.** 212]. Reference is made to LÖFFLER's (1909) observations on this question. Although experimental proof was not given, LÖFFLER considered that cattle could excrete virus up to seven months after recovery. The author (1924) also found by ordinary animal inoculation without enrichment of virus, that in one exceptional case an infected guinea pig was still excreting virus up to the 198th day after infection, though the animal died at that time, so it cannot be classed as a " recovered carrier " : in other experiments the interval averaged about three weeks.—J. E.

GALEA, M., & FALCHETTI, E. (1932). Virus aphteux et foyer d'inflammation locale. [**Foot and Mouth Disease and Seats of Local Inflammation**].—*C. R. Soc. Biol. Paris.* **110.** 189-192.

Two groups of experiments are recorded. In the first, ten guinea pigs were inoculated with BCG or " farine d'infusoires " [triturated infusoria], three days later foot and mouth disease virus was inoculated into the inflamed areas. The virulence of the virus does not appear to have been affected.

In the second group of experiments, foot and mouth disease virus was inoculated into the plantar pads of 25 guinea pigs exhibiting inflammatory conditions in other parts of the body, induced by the same means as in the first group. The virus persisted six days in the inflammatory areas caused by the subcutaneous inoculation of BCG, whereas in the lesions due to the inoculation of " farine d'infusoires " it was alive only four days.

Thirty-five guinea pigs divided into several groups were used in these experiments. [This number is far too small on which to base any findings].

—NORMAN DOBSON.

HECKE, F. (1931). Weitere Mitteilungen über die künstliche Vermehrung des Maul- und Klauenseuchevirus in Gewebekulturen. [**Further Observations on the Propagation of the Virus of Foot and Mouth Disease in Tissue**

Cultures].—*Zlb. Bakt. I.* (*Orig.*). **119.** 385-397. 3 tables, 2 charts. [11 refs.]

The author, continuing his studies on the propagation of the virus of foot and mouth disease in tissue cultures, now reports that he has succeeded in maintaining its virulence in two series of passages, using guinea pig foetal skin, for periods of 59 days, (14 passages) and 81 days, (17 passages) respectively. The total maximum multiplication of the virus in both series was about 2×10^{18}.

If the virus is allowed to remain in the tissue cultures for a period of seven days, without a passage being made, it becomes attenuated and this is manifested by an absence of multiplication in succeeding passages. In general, the results show that there is a tendency for the degree of multiplication to increase during a certain number of passages up to a maximum. After this point has been reached a total loss of virulence occurs. During the course of the experiments the strain of virus employed remained true to type [A, i.e. Vallée and Carré 0]. A multiplication of the virus was also obtained in tissue cultures of guinea pigs' testicle at 30°C. The loss of virulence occurred earlier than in the skin cultures. The total multiplication of the virus which took place in this case during eight passages was 4×10^7. No multiplication of the viruses was detected either in tissue cultures of the liver and parotid of adult guinea pigs or in those of foetal small intestine. In the case of the last named tissue the loss of virulence was complete after 24 hours.—I. A. Galloway.

Haji, C. S. G. (1932). **Rinderpest in Camels.**—*Ind. Vet. J.* **9.** 13-14.

This article briefly reviews earlier literature on the subject of the susceptibility of camels to rinderpest and records that, in recent outbreaks of the disease in Sind and Karachi which assumed a very virulent type in cattle, camels contracted infection by natural exposure.

The symptoms shown were fever, prostration, foetid diarrhoea and a vesicular eruption on the lips, tongue and dental pad with subsequent ulceration. The mortality varied from 20 to 40 per cent. Treatment, with intravenous injections of 1 per cent. iodine solution and the oral administration of potassium permanganate, was said to be markedly beneficial.—U. F. Richardson.

Yakimoff, W. L., Gadschieff, S., Nezwetaieff, N. W., & Schmoulewitsch, A. I. (1932). L'influence du virus de la peste bovine sur les piroplasmoses latentes des bovidés. [**The Influence of the Virus of Rinderpest on Latent Piroplasms** [**and Anaplasms**] **of Cattle**].—*Bull. Soc. Path. exot.* **25.** 728-735. 3 tables. [10 refs.]

Eighteen cattle were inoculated with rinderpest virus ; at the time of inoculation nine showed *Gonderia* [*Theileria*] *mutans*, two showed *Theileria mutans* and *Anaplasma*, one showed *Anaplasma*, five were negative and one was not examined. On re-examination daily after the commencement of the febrile reaction ; *Babesia bigemina* was detected in 17 animals, *T. mutans*, *Françaiella colchica* and *Françaiella caucasica* in 4 animals and *Anaplasma* in 10 animals.

[*Françaiella* is a name suggested by Yakimoff for those members of the *Babesiella* or *Babesia* group in which the piroplasm is centrally placed in the blood corpuscle and trypan blue has no curative action].—U. F. Richardson.

Holmes, Barbara E., & Pirie, Antoinette. (1932). **Growth and Metabolism of the Bovine Pleuro-Pneumonia Virus.**—*Brit. J. Exp. Path.* **13.** 364-370. 1 table, 3 charts. [2 refs.]

This is an attempt to ascertain the changes in serum broth cultures by biochemical methods. Glucose added to the medium was fermented only slightly

during the first 24 hours, but very markedly during the second 24 hours, coincident with the rapid increase in the virus. A centrifugate suspended in saline or Ringer's solution reduced methylene blue very slowly, but, after the addition of broth or sodium lactate, very rapidly. This increase in reducing activity was not obtained with glucose, formate, succinate, alanine, or hypoxanthine. Reduction of methylene blue in the presence of sodium lactate by serum broth cultures showed rapid increase until the third day of incubation ; the rate of reduction in this reaction might be taken to correspond with the growth-rate of the virus. Cultures showed very slight ammonia production and no increase in amino-nitrogen. When a sugar-free broth was used in the culture medium, growth was rather slower than with ordinary broth, but the concentration of live virus present, as indicated by the sodium lactate-methylene blue test, was as high after six days as after three days. The addition of glucose to the medium promoted growth but, owing to the acidity produced, the concentration of live virus fell quickly after 48 hours, unless sufficient phosphate or other buffer had been added to the medium.

—J. T. Edwards.

I. Curphey, T. J. (1932). **Observations on the Transmissibility of Hog Cholera and its Prevention by Quarantine.**—*J. Amer. Vet. Med. Ass.* **80.** 886-890. 3 figs.

II. Benner, J. W. (1932). **Hog Cholera Problems.**—*Cornell Vet.* **22.** 98-108.

I. Curphey describes an experiment in which 15 susceptible pigs were kept for eight weeks in a special quarantine pen in a barn containing pigs affected with swine fever (hog cholera), without contracting infection. The pen was fly-proof and attendants entering it had to disinfect their clothes and boots.

On completion of the experiment the attendants circulated among the affected pigs and then entered the quarantine pen ; four to seven days later one of the experimental pigs contracted swine fever.

II. Benner discusses the diagnosis, symptoms and lesions of swine fever and its control by the serum-virus method of immunization.

—T. M. Doyle.

I. Hegyeli, Z. (1932). Sur les porteurs de virus dans la peste porcine après la contagion et après la vaccination simultanée. [**Swine Fever " Carriers" after Natural and Artificial Infection**].—*Bull. Off. internat. Epiz.* **6.** 196-200. [1 ref.]

II. Wagener, K. (1932). **Bacteriologic Examination of Commercial Hog Cholera Virus for Organisms of the Pig-Typhus-Suipestifer Group.**—*Cornell Vet.* **22.** 261-264. 1 table. [3 refs.]

I. Hegyeli carried out experiments to determine the duration of infection in pigs following the serum-virus method of immunization. Nine pigs were vaccinated and kept for three months on infected premises. These animals were killed and the spleens and lymphatic glands crushed, suspended in normal saline and injected into three young pigs. The inoculated pigs remained healthy and, a month later, were proved to be susceptible to swine fever.

In a second experiment the urine of five pigs was collected on the 4th, 7th, 9th, 11th, 15th, 17th and 19th days after serum-virus vaccination and inoculated subcutaneously in 10 c.c. doses into young pigs. The virus was found to be present in the urine up to the 17th day and, exceptionally, on the 19th day. It was not demonstrated by animal inoculation in the spleen or lymphatic glands after 21 days, but a minute quantity was apparently present as pigs inoculated with the urine subsequently resisted artificial infection,

In immunized pigs which were given 200 to 500 c.c. of virulent blood intravenously, the virus could not be demonstrated in the urine by animal inoculation after the 5th day or after the 16th day in the organs.

II. Wagener made cultural tests on plain agar and on Gässner medium of 56 samples of commercial swine fever virus for the presence of *Bact. suipestifer* and allied bacteria. No bacteria of the salmonella group were isolated from the samples of virus tested.

" Gässner medium is a waterblue-metachromyellow agar as used for the identification of organisms of the typhus-paratyphus-coli groups. For its preparation see (Standfusz) Bacteriologische Fleischbeschau, p. 125 (Schoetz) Berlin, 1928."

—T. M. Doyle.

I. Jonnesco, D. (1932). Recherches sur la réversibilité du virus rabique fixe. [**Research on the Reversibility of Fixed Rabies Virus**].—*Ann. Inst. Pasteur.* **48.** 735-743. [6 refs.]

II. Levaditi, C., Schoen, R., & Mezger, J. G. (1932). L'irréversibilité de la mutation du virus rabique des rues en virus fixe. [**The Irreversible Nature of Street Rabies Virus to Fixed Rabies Virus**].—*C. R. Soc. Biol. Paris.* **110.** 274-277. 2 text figs. [1 ref.]

III. Nicolau, S., Mathis, C., & Constantinesco, Val. (1932). Sur la transformation en virus fixe d'une souche particulière de virus rabique des rues. [**The Transformation of a Particular Strain of Street Rabies Virus to Fixed Virus**].—*Ibid.* 433-435. [2 refs.]

I. The intracerebral inoculation of either street or fixed virus into hedgehogs or spermophiles augments the virulence of the strain for the rabbit and shortens the period of incubation. A few passages of such an altered strain, in rabbits, brings about a return to the original state of virulence and incubation. Primary inoculation of dogs with a hedgehog-adapted fixed virus yielded a type of rabies more suggestive of the " furious " kind with numerous Negri bodies in the brain. The hedgehog is resistant to the virus and occasionally the brain material of animals dying after prolonged illness was found to be autosterilized, although containing Negri bodies. The evidence suggests that the mutation of street to fixed virus is not irreversible.

II. Serial passage of fixed virus in mice augments the number of Negri bodies, without influencing the incubation period.

III. One fixed virus which killed rabbits in from 8 to 10 days and another, killing in from 10 to 12 days, were obtained from one particular street virus by rabbit inoculation.—Norman Hole.

I. Marie, A. C., & Urbain, A. (1931). Virus rabique fixe et virulence du sang. [**The " Fixed Virus " of Rabies and the Virulence of the Blood**].—*C. R. Soc. Biol. Paris.* **106.** 166-168. [1 ref.]

II. Remlinger, P., & Bailly, J. (1931). Présence du virus rabique dans le foie et dans le rein. [**The Presence of Rabies Virus in the Liver and Kidney**].—*Ibid.* **107.** 201-202. [1 ref.]

I. It is admitted that the virus is rarely present in the body fluids of animals infected with the fixed virus of rabies, but the authors were able to establish its presence in the blood of eight out of 32 rabbits which between the fourth and sixth days of an attack had been inoculated with a 10 per cent. solution of concentrated tuberculin, dry milk powder in saline or dilute gonacrine into the subarachnoid space. Potassium iodide and cholesterin failed to produce the same result.

II. Reference is made to previous work in which the virus was demonstrated in the spleens of animals infected with rabies. The experiments described in the present article consisted in suspending 4 to 5 g. of liver or kidney substance from animals infected with rabies and inoculating, as much as possible subdurally and the remainder intramuscularly, into the neck region of guinea pigs. Some positive results were obtained when the material was derived from infected cats and rabbits, but negative results were obtained with material from rats and dogs. It is believed that the positive results were due to the presence of nerve substance in the tissues.
—R. S. Roberts.

I. Stafseth, H. J. (1931). **Fowl Pox Vaccination and Suggestions for Handling Roup.**—*Vet. Med.* **27.** 148-149.
II. Johnson, E. P. (1932). **Pigeon Pox Virus and Immunization against Chicken-Pox in Fowls.**—*North Amer. Vet.* **13.** No. 3. 47-48. [2 refs.]
III. Pierce, G. H. (1932). **The Ohio Plan of Fowl Pox Vaccination.**—*J. Amer. Vet. Med. Ass.* **80.** 505-506.

I. Stafseth recommends the use of pigeon pox virus for the immunization of adult birds against fowl pox. Vaccine prepared from fowl pox virus confers a solid immunity, but is not free from danger, whereas pigeon pox vaccine is free from danger, but the immunity conferred is not so durable as that following the use of fowl pox virus.

For immunization against roup (contagious catarrh) the author recommends a bacterin containing 80 per cent. *Staphylococcus aureus* and some streptococci.

[Although the term "roup" is frequently used by a layman as a synonym for fowl pox, the two diseases are distinct. There is considerable evidence that contagious catarrh is caused by a virus, therefore, the protection conferred against the disease by bacterins prepared from secondary organisms must be slight].

II. Johnson reports favourable results from the use of pigeon pox virus as a cutaneous vaccine against fowl pox. Field experiments have shown that the vaccine confers protection against natural infection with fowl pox for at least one year.

III. Pierce describes a scheme carried out in Ohio for the control of fowl pox in which veterinarians, county agents and farmers co-operated.—T. M. Doyle.

I. Hallauer, C. (1931). Ueber das Verhalten von Hühnerpestvirus in der Gewebekultur. [**On the Behaviour of the Virus of Fowl Plague in Tissue Culture**].—*Zschr. Hyg. u. Infektkr.* **113.** 61-74. [27 refs.]
II. Plotz, H. (1932). Culture de la peste aviaire en présence de cellules embryonnaires vivantes. [**Cultivation of the Virus of Fowl Plague in the Presence of Living Embryonic Cells**].—*C. R. Soc. Biol. Paris.* **110.** 163-164. [2 refs.]

I. From the results of his experiments the author concludes that it is possible to cultivate the virus of fowl plague in fresh living tissue pulp from chicken embryos. Nine passages in cultures of this tissue pulp were made at 8-day intervals during a period of 88 days. The multiplication of the virus which had taken place during this period was estimated to be 10^{40} when the dilution factor was 1 : 10,000. No multiplication of the virus was obtained in killed chicken embryo pulp tissues ; in fact the virus did not survive therein longer than about 48 hours.

While certain tissues, skin, brain and the epithelium of the iris were found to be very well suited for the propagation of the virus, others were quite unsatisfactory. Thus the virus appeared to be preserved in pure tissue cultures of fibroblasts,

osteoblasts and monocytes (macrophages) for a relatively longer time than in tissue cultures of the tissues cited above, but it showed no tendency to multiply therein and no success was attained in making passages. The suggestion is made that these facts point to the virus possessing epitheliotropic and encephalotropic characters. The results obtained with tissue cultures of skin were similar to those obtained with those of the whole pulp tissue of chicken embryos. In brain tissue cultures, in which an abundant growth of microglia (Hortega), nerve fibres and the " neuro-epithelium " described by KAPEL was observed, 8 passages were made at about 4-day intervals during a period of 36 days and the multiplication of the virus was estimated to be 10^{36}. In tissue cultures of the epithelium of the iris, 8 passages were made at about 3-day intervals during a period of 36 days and the degree of multiplication of the virus was estimated to be 10^{22}. It is to be noted that the cultures of the iris epithelium were infected with virus about the 4th or 5th day when an abundant growth of epithelium was manifest. In tissue cultures prepared from the embryo-pulp of pigeon, goose and duck the virus propagated as in the cultures prepared from the fowl embryo. No evidence was obtained of multiplication of the virus in tissue cultures prepared from the embryo pulp of rat and mouse. In such cultures the virus could not be detected after 72 hours. It is noted that in a pure tissue culture of a mouse carcinoma the virus may survive during a period of 8 days, which is much longer than in normal mouse tissue cultures.

Evidence is produced that the degree of virus multiplication was proportional to the mass of tissue used and the amount of proliferation of the tissue in the culture. In tissue cultures kept at 8°C. and with a deficient nutrient phase no increase or only a low degree of multiplication of the virus was detected. In the tissue cultures infected with virus the author describes what he considers to be characteristic morphological changes, a process of necrobiosis, fatty degeneration of the cells, etc. A full description is given of the experimental technique employed.

II. This worker also records that he has obtained multiplication of the virus of fowl plague in the presence of living embryonic cells.

Fifteen passages were made in tissue cultures at about 5-day intervals during a period of 94 days and it was estimated that a definite multiplication of the virus had taken place.

Tissue cultures of virus in sealed ampoules kept at 0°C. were found to be still virulent after a month, but only after 17 days under the same conditions in unsealed tubes. Cultures kept at 37°C. were infective up to about the 9th day. The author used Drew's fluid in the nutrient phase as he had no success with Tyrode's fluid. [See the technique used in experiments described in I in which the latter fluid was employed with successful results].—I. A. GALLOWAY.

I. SEIFRIED, O. (1931). **Intranuclear Inclusions in Laryngotracheitis of Chickens.**—*Science.* **73.** 594-595. [1 ref.]

II. HINSHAW, W. R., JONES, E. E., & GRAYBILL, H. W. (1931). **A Study of Mortality and Egg Production in Flocks Affected with Infectious Laryngotracheitis.**—*Poultry Sci.* **10.** 375-382. 3 figs., 2 tables.

I. Seifried records the presence of intranuclear inclusion bodies in the epithelial cells of the mucous membrane and mucous glands of the larynx and trachea of fowls naturally or artificially affected with laryngotracheitis. The inclusions consist of round, oval or irregularly shaped, homogenous, acidophilic masses, which resist the solvent action of acetic acid, alcohol and chloroform.

II. Hinshaw, Jones and Graybill record data obtained from 25 outbreaks of laryngotracheitis which occurred in eight different districts of California. The average course of the disease was 15 days and the average mortality 13 per cent.

There was a heavy fall in egg production in the affected flocks.—T. M. DOYLE.

FROBISHER, M., Jr. (1932). **Precipitin Experiments with Yellow Fever Virus.**—*Amer. J. Hyg.* **15.** 484-497. 4 tables. [15 refs.]

The question as to the chemical nature of the viruses in general is an extremely difficult one because of the problems involved in chemically isolating the infectious agents from the proteins with which they are associated. For example, little is known as yet concerning the actual nature of the virus of yellow fever and there is still considerable doubt as to the chemical composition, the physical structure and even the state of animation of the virus. The same applies to many of the so-called " viruses " responsible for the diseases of animals. The above experiments, therefore, are of some interest to veterinary readers.

Using the technique described in the paper, the virus of yellow fever in mosquitoes was found to engender in rabbits neither precipitins nor protective bodies against the same virus contained in monkey blood. Large amounts of the virus from the blood of infected monkeys failed to produce in rabbits demonstrable precipitins against the virus in mosquitoes, but relatively tiny amounts engendered protective bodies against monkey-blood virus. Using an anti-monkey precipitating serum capable of detecting one part of monkey serum in 20,000 parts of saline solution, it was not possible to demonstrate the presence of monkey protein in *Aedes aegypti* later than the fourth day after their blood meal.

The technique adopted is worthy of the consideration of others interested in similar problems.—LL. E. W. BEVAN.

I. YOSHIZUMI, T. (1931). **Criticism on the Specificity of Bacteriophage.**—*Jap. J. Exp. Med.* **9.** 359-364. [6 refs.] [Orig. in English].

II. LIPSKA, Irene. (1931). **D'Herelle's Phenomenon in Milk.**—*Internat. Dairy Congress. 2nd Section.* pp. 97-98.

III. GOLDIE, H. (1931). Mesure de l'activité des substances microbiennes inhibitrices au moyen de substances colorantes. [**Estimation of the Activity of Inhibiting Bacterial Substances by Means of Coloured Substances**].—*C. R. Soc. Biol. Paris.* **108.** 840-841.

IV. BEARD, P. J. (1931). **Bacteriophage Adaptation.**—*J. Infect. Dis.* **49.** 367-398. 14 tables. [50 refs.]

I. The neutralization of 14 phages against 14 anti-bacteriophagic sera was carried out and it was shown that phage and its homologous antiphage reaction is always specific, no matter whether the lytic action is strictly specific or if it is non-specific. Two different species of phage were obtained which possessed the same lytic action. The author considers that it is of great importance that phages which possess entirely the same lytic action upon bacilli are not necessarily of similar species.

II. The constant occurrence of coli-bacteriophages was found both in new and in commercial milk ; their virulence corresponded to the bacteriophages found in faeces. These bacteriophages are capable of surviving the bactericidal phase of the milk and can bring about a complete bacteriophagy in cultures of susceptible strains of the *Bact. coli.*

III. The metabolism of bacteria is based upon the phenomena of oxidation and reduction. The activity of a culture is invariably followed by the fixation or transposition of the oxygen of the media. To ordinary media two drops of a 2 per cent. solution of crystal violet is added. After sowing the media with any kind of bacteria they lose their colour. The rapidity of the decolouration depends upon the type of organism employed. Filtrates of cultures occasionally change

the colour of the media to which crystal violet has been added. This phenomenon does not take place when there are sown in the filtrate homologous organisms which alone are capable of changing the colour. It produces a form of inactivation due to fixation of the bacteria and the antivirus. The apparent absence of multiplication of the organisms in homologous antivirus suggests not only the arrest of the multiplication of the organisms, but also the depression of their metabolism.

IV. A number of experiments on the adaptation of bacteriophage are described in this article. A representative variety of bacteriophages and bacterial substrates were employed, but the experiments failed to show any capacity for adaptation within the limits of the terms stated. The author considers that the sudden acquisition of a new virulence should be regarded with suspicion and as more likely to indicate contamination than adaptation.

The author quotes a number of extracts from the publications of many workers upon this subject of adaptation. He considers that much of the discussion in the literature concerning adaptation is based upon errors of technique and interpretation. Confirmation of this experimental work demonstrating lack of adaptability within the limits of the definition formulated will show by D'HERELLE's own criteria of life that the bacteriophage is not living, since it does not possess the faculty of adaptation.—NORMAN DOBSON.

INVERTEBRATE VECTORS OF DISEASE.

HEGUITO, H. R. (1932). Disertación sobre la lucha contra la garrapata. **[Dissertation upon Tick Control]**.—*Rev. Zootéc.* **19.** 390-404.

The northern regions of the Argentine are heavily infested with ticks, but the south is comparatively free. As the purer breeds of cattle are in the southern regions many trading difficulties arise, southern cattle being susceptible to tick-borne infections if transported to the north, and regulations governing movement of cattle from infested to clean districts preventing movement from north to south. It is of interest to note that, before the regulations were enforced, when cattle moved freely from north to south, the ticks never became established in the south. This is probably due to the finer nature of the pastures.

Owing to the large volume of dip used, it is often difficult to dispose of it without contaminating surrounding pasture and the author has recently found that the arsenite can be precipited by adding 2·5 kg. of quicklime to each 1,000 litres of dip, allowing to stand for a few hours and decanting the supernatant, which, in quantities of 7 litres, was found to be harmless to a sheep. The volume to be disposed of is thus reduced to 15 per cent.—R. S. ROBERTS.

CRAIG, C. F. (1932). **A Possible Chemotactic Effect of the Salivary Secretions of Certain Insects upon Microfilariae.**—*Science.* **75.** 561-562. [1 ref.]

It has recently been observed by STRONG that the bite of the eusimulium fly which transmits *Onchocerca caecutiens* has the power of concentrating the microfilariae, and that sections made of the skin in the region of a recent bite may show microfilariae in large numbers when they are very difficult to find elsewhere. The author points out that ASHBURN and CRAIG (1907) reported the same phenomenon in the concentration of the microfilariae of *Wuchereria bancrofti* by the bite of *Culex quinquefasciatus* and called attention to the possibilities of its use in diagnosis.

—E. L. TAYLOR.

DISEASES CAUSED BY METAZOAN PARASITES.

KOLBE, F. (1932). Neueres über Hypoderma bovis und seine Bekämpfung. II. [**New Information on** *Hypoderma bovis* **and the Campaign against it. II**].—*Zschr. Fleisch- u. Milchhyg.* **42.** 157-158. [25 refs.]

GÖTZE, R. (1932). Die Bekämpfung des Dassellarvenbefalls der Rinder. [**The Campaign against Warble Infection in Cattle**].—*Deuts. tierärztl. Wschr.* **40.** 449-451.

SCHWERDT. (1932). Die Bekämpfung des Dasselbefalls der Rinder. [**The Campaign against Warble Infection in Cattle**].—*Berl. tierärztl. Wschr.* **48.** 552.

The first paper gives an account of the life history of *Hypoderma bovis* and remarks that the following points require further investigation :—(1) the exact number of larval stages and their distinctive characteristics ; (2) the course taken by the larvae in migrating from the skin to the oesophagus ; (3) the causes of the mortality of immature larvae and (4) the conditions which favour or inhibit successful pupation. Dressings are discussed and the successful use of " Spannschen Stäbchen " in mass treatment of cattle in the Bavarian Alps is recorded.

The second paper discusses the methods adopted in various countries for the control of warble flies and stresses the importance of official compulsory treatment. Various dressings are discussed and preference is given to derris root, owing to the simplicity and cheapness of application and to the fact that after two dressings, at intervals of from two to three days, further mass treatment can be dispensed with. The dressing recommended consists of 1,000 g. derris root powder steeped in 9,000 c.c. water for 24 hours and 250 g. soap in 1,000 c.c. water. Before use the solutions are mixed so that the wash contains 1 kg. derris root to 10 litres wash, which is sufficient for 20 animals. The wash will only keep for a week.

The small number of secondary larvae seen after treatment is remarkable and none appear within four weeks. The author considers that further investigations are required to ascertain if all samples of derris root are equally efficient and suggests that biological tests of samples should be carried out on fly larvae before their use on warble-infected cattle.

The third paper draws attention to the report of Prof. SPANN on the successful removal of 10,000 larvae by the crochet hook method without the appearance of anaphylaxis and also urges an early and full investigation of the efficiency of derris root.—U. F. RICHARDSON.

—. (1931). Bekämpfung der Dasselplage. [**The Campaign against Warble Pest**].—*Berl. tierärztl. Wschr.* **47.** 589-590.

SCHWERDT. (1931). Planmässige Bekämpfung der Dasselfliegenplage. Sitzung der Propaganda-Kommission in Reichsernahrungsministerium. [**Modified Plan for the Campaign against Warble Pest. Sitting of the Propaganda Commission at the Ministry of Nutrition**].—*Ibid.* 802-804.

The first article publishes draft rules for the control of warble infestation. It is proposed that in controlled areas every cattle owner must rid his stock of warble fly before April 15th and any cattle taken into a market or other public place must also be free from larvae. A maximum fine of RM. 300 is suggested if the rules are not obeyed. It is pointed out that in Denmark a law was made in 1921. In 1922, 23 per cent. of hides were affected and by 1929 this had been reduced to 5 per cent.

The second article deals with a meeting of the Anti-Warble Propaganda Commission, on September 21st, 1931, when it was stated that the proposed rules would be postponed, but that the Government was prepared to give limited assistance

if a practicable scheme for warble eradication could be evolved. The meeting recommended that 5 per cent. of funds should be allocated to propaganda and 95 per cent. to the work of eradication. A special propaganda committee should be formed to issue leaflets and arrange lectures and broadcasts.

The eradication work would be supervised by an advisory board. The work would be undertaken in South Bavaria and Schleswig-Holstein. The district veterinary officers would make an estimate of the cattle involved and of the additional labour required for which local unemployed would be utilized. The estimate would be forwarded to the Ministry through the advisory board. The method of treating individual warble "swellings" should be adopted, but no definite remedy should be laid down. In discussion it was said that Peter's carbolic ointment and two proprietary remedies, "Delicia II" and "Spannschen Stäbschen" were satisfactory, whilst too little was known as to the standardization of "Derrys." By co-operation with the owners arrangements were to be made to treat the cattle three times, at the end of January, when moving to pasture and a third time according to local facilities.—U. F. RICHARDSON.

I. MILLER, H. M., Jr. (1932). **Superinfection of Cats with Taenia taeniaeformis.**—*J. Prevent. Med.* **6.** 17-29. 2 figs., 6 tables. [2 refs.]

II. MILLER, H. M., Jr., & MASSIE, E. (1932). **Persistence of Acquired Immunity to Cysticercus fasciolaris After Removal of the Worms.**—*Ibid.* 31-36. 2 tables. [4 refs.]

III. MILLER, H. M., Jr. (1932). **Further Studies on Immunity to a Metazoan Parasite, Cysticercus fasciolaris.**—*Ibid.* 37-46. 4 tables. [4 refs.]

I. The author has previously shown that infection with the larval stage of *T. taeniaeformis* renders the rat immune to subsequent infection with this parasite. *Post-mortem* examinations on more than 600 cats have shown that both the fully matured and the young adults of this species may be found in the intestine of one cat at the same time, suggesting that infection does not confer immunity. Infection experiments which were carried out demonstrated conclusively the absence of an immune response and 17 out of 41 cats were successfully infected on two successive occasions.

II. The experiments described in the second paper were carried out to ascertain whether the immunity of the white rats infected with the larval stage of this worm would persist after the extraction of the worms from the cysts in the liver. Laparotomy was performed on 29 infected rats and as far as possible al the worms were removed from the cysts in the liver. Between 33 and 60 days later each of these rats and each of 12 control rats of the same age received 400 oncospheres of *T. taeniaeformis*. An average of 77 larvae, living and dead, were found in the 12 control rats, but only 3 dead larvae were found in the 29 experimental animals.

III. The third paper gives an account of further observations on the acquired immunity of the white rat to the larval stage of *T. taeniaeformis*. It was shown that the immunity produced by intraperitoneal injection of powdered strobila is strong enough to withstand infection 167 days later. Powdered strobila from which the lipoids had been extracted caused the production of immunity. Powdered *T. pisiformis* from the dog failed to cause the production of immunity to the larval stage of *T. taeniaeformis* in rats. Injection of powdered strobila of *T. taeniaeformis* after the rats were infected did not cause inhibition of cyst development.

—E. L. TAYLOR.

SHAW, J. N. (1932). **Studies of the Liver Fluke** (*Fasciola hepatica*).—*J. Amer.*

Vet. Med. Ass. **81.** 76-82. 2 figs., 1 table. [5 refs.]

Observations on *Limnaea truncatula* infested under controlled conditions showed that the cercariae of the liver fluke may develop in from 7 to 14 weeks although the usual time is nearer 14 than 7. The evolution of cercariae from the snail was in one instance observed to continue for two months.

Cysts kept in moist cotton wool in covered dishes in the cold store at a temperature which, for most of the time was a little above freezing point, remained alive and infective for 11 months. [The author describes these conditions as " rather adverse " and refers the observation to the duration of the infectivity of hay. It is not improbable, however, that conditions of cold storage are optimum conditions for the longevity of the cysts and the observation can have no bearing on the infectivity of hay].

Experimental results were obtained confirming previous findings on the route of migration of young flukes from the bowel to the liver, numerous young flukes having been recovered from the peritoneal cavity of guinea pigs and lambs. A solution of 1 : 500 copper sulphate in water was found to kill the encysted cercariae and it is suggested that heavy dressings of copper sulphate might with advantage be applied to particularly heavily infected patches in a field with the idea of killing this resting stage of the fluke as well as of killing the intermediate host.—E. L. Taylor.

Nöller, W. (1932). Ueber die Rolle der Wildkaninchen als Lanzettegelträger in einem Thüringer Lanzettegelgebiete. **[The Role of Wild Rabbits as Carriers of the Lanceolate Liver Fluke].**—*Tierärztl. Rdsch.* **38.** 190-191. [2 refs.]

Of 94 rabbits from a district where dicrocoelium infestation is common in sheep, 24 were found to be carrying the trematode *D. dendriticum*. Laboratory work which has subsequently been carried out (a report of this will be published elsewhere) has shown that rabbits cannot be directly infected with *Cercaria longicaudata* (*C. vitrina*) which is the cercaria of *D. dendriticum*, and it is thought that some second intermediate host may be required. The fact that an American species of bat acts as host for another member of the genus *Dicrocoelium* suggests that some flying insect may be concerned. The snails which harbour *C. longicaudata* (*C. vitrina*) are subject to parasitism by the larvae of flies and the possibility of the cercariae encysting in these is being investigated.—E. L. Taylor.

MacHattie, C., & Chadwick, C. R. (1932). *Schistosoma bovis* **and** *S. mattheei* **in Irak with Notes on the Development of Eggs of the** *S. haematobium* **Pattern.**—*Trans. Roy. Soc. Trop. Med. Hyg. London.* **26.** 147-156. 2 plates. [16 refs.]

The differentiation of the species *S. mattheei* and *S. bovis* is dependent upon the shape of the egg which in *S. mattheei* is broader and in general resembles that of *S. haematobium*. During the examination of a large number of specimens of *S. bovis* from various parts of Irak the authors came across two females which contained eggs similar to those described for *S. mattheei*. On further search, they finally found two female specimens which contained eggs corresponding both to those of *S. bovis* and those as described for *S. mattheei*. They concluded that these broad eggs are produced as a result of an abnormal action of the ovarian organs of the female and that *S. bovis* and *S. mattheei* are one and the same species. [In *Trans. Roy. Soc. Trop. Med. Hyg. London.* **26.** 201. there appears a review of a publication by W. A. Blackie entitled " A Helminthological Survey of Southern Rhodesia," in which it is mentioned that *S. mattheei* is found with surprising

frequency in man in that country].—E. L. Taylor.

Bohl, B. K., & Jakowlew, J. J. (1931). Die pathologische Anatomie der Katzenleber bei Opisthorchis felineus. [**The Pathological Anatomy of** *Opisthorchis felineus* **Infection in the Liver of the Cat**].—*Virchows Arch. path. Anat.* **279.** 724-730. 6 figs. [13 refs.]

A study was made of the pathological changes which had taken place in 12 cats' livers as a result of infestation with *Opisthorchis felineus*.

A catarrhal inflammation of the bile ducts was observed, which in some instances extended to the glandular epithelium and resulted in the development of outgrowths of a papillomatous or adenomatous character.

Cirrhosis was of the biliary type and was not much in evidence except at the margins of the liver. A considerable growth of smooth muscle tissue was noted in the bile ducts in association with the glandular outgrowths. The growth of glandular epithelium is considered to be an expression of regeneration.

—E. L. Taylor.

Hoeppli, R., & Hsü, H. F. (1931). **Histological Changes in the Digestive Tract of Vertebrates due to Parasitic Worms.**—*Nat. Med. J. China.* **17.** 557-566. 4 figs. on 2 plates. [8 refs.]

A study has been made of the lesions produced by certain parasitic worms in seven cold-blooded vertebrates and in a bird. Nodules similar to those caused by *Raillietina echinobothrida* in the intestine of the fowl were observed to be produced by *Ophidascaris excavata* in the stomach of a snake, and tunnels similar to those which have been found in association with *Dipylidium caninum* in dogs were observed in the mucosa and submucosa of the frog's intestine, caused by *Spiroxys japonica*.—E. L. Taylor.

I. Woltmann. (1932). Neue Beobachtungen über Strongyliden. [**New Observations on Strongyles**].—*Tierärztl. Rdsch.* **38.** 323-324.

II. Gackstatter. (1932). Einfluss von Wasser und Frost auf die Entwicklungsfähigkeit der Sklerostomeneier. [**The Influence of Water and Frost on the Viability of Sclerostome Eggs**].—*Zschr. Veterinärk.* **44.** 334-339. 4 tables. [7 refs.]

I. The author has observed that certain small haemorrhages in the pancreas of the horse frequently contain strongyle larvae from 1 to 2 cm. long. These, he considers, have wandered from the aneurisms in the mesenteric arteries and are on their way to the intestine by way of the pancreatic duct. [*Strongylus equinus* has frequently been observed in this situation].

II. The author has previously described observations on the effect of excess of water on the development of the eggs of sclerotomes ; after standing in water for four days neither eggs nor larvae could be found in the faeces. In the present paper observations are reported on the development of eggs in faeces half submerged in water. As a result of these it was found that the eggs are not destroyed, but that development is inhibited and that after five weeks, on returning to normal conditions, it proceeds in the ordinary way. Five weeks was the longest period observed, but is doubtless not the end point.

Observations on the effect of low temperatures under natural conditions showed that the eggs can withstand continuous freezing for at least 15 days.

—E. L. Taylor.

Ullrich, K. (1932). Die Magenwurmseuche der Gänse. [**Gizzard-Worm**

Disease of Geese].—*Prag. Arch. Tiermed.* **12.** 61-68. 4 figs. on 1 plate.

This paper describes the symptomatology and pathology of helminthiasis of the gizzard of geese, resultant upon a heavy infestation with the gizzard-worm *Amidostomum nodulosum* ; a description of the worm and an account of the life history also being given. A symptom which does not appear to have been described previously is a form of ataxia which the author has definitely been able to associate with this disease.

The pathology is that of a superficial gastritis, the submucosa being unaffected ; the worms do not penetrate into the openings of the glands, as they have frequently been said to do, their large size rendering this a physical impossibility.

Carbon tetrachloride is strongly recommended as a curative treatment, a dose of 2 c.c. in from 10 to 12 c.c. of gruel being suitable for a four weeks old gosling. The mixture is shaken to make an emulsion and immediately given to the geese by means of a 20 c.c. syringe with a long rubber tube attached. The geese should have fasted for 12 hours before the emulsion is administered.—E. L. Taylor.

Kreis, H. A. (1932). **Studies on the Genus** *Strongyloides* (**Nematodes**).—*Amer. J. Hyg.* **16.** 450-491. 42 figs., 19 tables. [35 refs.]

In this paper the author reports a series of observations on the morphology and biology of strongyloides from the dog, the monkey, and from man. The greater part is given to morphology, the various free-living and parasitic stages of the worms from the three hosts being described in detail and clearly illustrated by line drawings. The most interesting and important contribution is that of the finding of parasitic males in man and in the dog. These occur in very small numbers, only four specimens having been collected, and their morphology is very similar to, if not identical with, that of the free-living male.

In view of the existence of parasitic males, it is concluded that the female is not parthenogenetic ; the author was also unable to find any structure suggestive of hermaphroditism. His strains of strongyloides from dog and man showed only the direct metamorphosis ; he agrees with other authors that these two belong to one and the same species, *Strongyloides stercoralis* ; but the strain from monkeys showed the indirect metamorphosis and furthermore proved to be morphologically distinct. The author thus confirms the views of Lü and Hoeppli, who first described this species under the name *S. simiae*.

A few observations are also made on the pathogenicity of these worms and on the bionomics of the free-living stages, showing that the genus *Strongyloides* is an exception to the rule for nematodes in that it has no marked powers of resistance against extremes of heat, cold and dryness.—E. L. Taylor.

Alicata, J. E. (1932). **Life History of the Rabbit Stomach Worm Obeliscoides cuniculi**.—*J. Agric. Res.* **44.** 401-419. 12 figs., 5 tables. [19 refs.]

Observations have been carried out on the free-living and parasitic stages of this nematode and the life history is found to conform to the general type for strongyles. The infective larvae proved to be incapable of penetrating the skin and were found to develop to sexual maturity within 16 to 20 days after reaching the stomach through the mouth. The pathogenicity of the parasite appears to be considerable, areas of inflammation, petechial haemorrhage, " blood clots in the stomach wall " and " erosion of the gastric glands and of the blood vessels " having been frequently observed in the experimental rabbits. Several guinea pigs were successfully infected and the worms developed to sexual maturity and produced eggs in the normal way.—E. L. Taylor.

I. ONORATO, A. R. (1932). **The Effects of Temperature and Humidity on the Ova of** *Toxocara canis* **and** *Trichuris vulpis*.—*Amer. J. Hyg.* **16.** 266-287. 11 tables. [12 refs.]

II. NOLF, L. O. (1932). **Experimental Studies on Certain Factors influencing the Development and Viability of the Ova of the Human Trichuris as compared with those of the Human Ascaris.**—*Ibid.* 288-322. 8 figs., 8 tables. [27 refs.]

I. In this study of the comparative resistance of the eggs of *Toxocara canis* (one of the ascarids of the dog) and *Trichuris vulpis* it was found that, contrary to what is generally supposed, the embryonated eggs of *Toxocara* are not markedly more resistant to desiccation than those of *Trichuris*, but that the eggs of *Toxocara* are able to proceed with their development at a lower relative humidity than are the eggs of *Trichuris*. The eggs of the *Trichuris*, however, require about two and a half times as long as those of the *Toxocara* to complete their development, so that any dry conditions which might occur in the open have a greater opportunity for affecting the *Trichuris* eggs. It is probably in this way that, under natural conditions, dryness is more lethal to *Trichuris* than to *Toxocara*.

The embryos of both kinds of eggs were found to develop best either in water or in a saturated atmosphere at 30°C.; *Trichuris* would also develop at 37°C., but the development of *Toxocara* was inhibited at that temperature. *Trichuris* eggs were found to hatch at 37°C. whereas no means has as yet been found of inducing the hatching of *Toxocara* eggs *in vitro*.

II. The author of the second paper has also made comparative studies of the powers of resistance to adverse conditions of the eggs of an *Ascaris* and a *Trichuris* (*Ascaris lumbricoides* and *Trichuris trichura*) and of their oxygen requirements. His findings are in agreement with those of ONORATO and of previous investigators with regard to the requirement of a greater relative humidity for the development of *Trichuris*. He finds that the undeveloped or partially developed eggs of *Trichuris* are killed by freezing at from –9°C. to –12°C., but that that temperature has no apparent effect upon *Ascaris*.

The oxygen requirements of the two kinds were found to be about the same, but there was considerable difference between their powers of resistance to ultra-violet rays, the dark pigmentation of the shell of the *Trichuris* egg apparently affording protection.—E. L. TAYLOR.

OTTO, G. F. (1932). **The Appearance and Significance of the Unfertilized Eggs of** *Ascaris lumbricoides* **(Linn).**—*J. Parasitol.* **18.** 269-273. 10 figs. on 1 plate, 1 table. [7 refs.]

This paper records some observations on the incidence of the unfertilized eggs of *Ascaris lumbricoides* in human faeces. The preparations examined numbered 820 and of the 51,329 eggs seen 15·9 per cent. were unfertilized. In 26 per cent. of the slides unfertilized eggs alone were found, indicating that a light infestation of females only was present, although in one instance the number of unfertile eggs showed at least 20 females and no males to be present. Figures are given illustrating the various shapes of unfertilized eggs.—E. L. TAYLOR.

LEBEDEW, N. A. (1931). Aortitis verminosa ossificans des Pferdes. [**Aortitis Verminosa Ossificans of the Horse**].—*Virchows Arch. path. Anat.* **279.** 534-537. 1 fig. [5 refs.]

Verminous aneurisms are particularly common in the anterior mesenteric artery of the horse and are occasionally observed in the aorta, but there appear to

be no previous records of the formation of osseous tissue in aneurisms in this situation.

The author here describes a large aneurism in the aorta, 23 cm. long and from 14 to 20 cm. in circumference, containing in its walls two formations of bone, measuring 11 × 9 cm. and 8 × 12 cm. respectively, in which he observed haversian canals with typical bone cells and bone marrow. A detailed description is given of the microscopic appearance of other parts of the wall of the aneurism.

—E. L. TAYLOR.

IMMUNITY.

NORDMANN, M. (1931). **Local Reactions in Sensitized Animals. Arthus Phenomenon, " Hyperergic Inflammation."**—*Physiol. Rev.* **11.** 41-62. [41 refs.]

The author reviews the reports of work on the ARTHUS phenomenon and gives a summary of the various theories which have been formulated.

Commencing with a detailed description of the original experiments of ARTHUS, he continues by describing work which shows that the phenomenon can occur in men, rats and guinea pigs, as well as in rabbits. All the work quoted indicates that the phenomenon is specific, but that susceptibility to it is in no way related to anaphylaxis.

The skin lesion is shown, microscopically, to be an inflammatory reaction ; this is true even of the original injection site, but it becomes more pronounced and rapid after subsequent injections. A similar reaction can be demonstrated in the internal organs.

Serologically, it has been shown that the reaction is not a protein sensitization as such a small dose gives a positive result, and passive sensitization can be obtained with large doses.

A relationship has been shown to exist between the reaction and the presence of precipitins, but it is not complete as the reaction is obtained before precipitins are present in the blood and also after they have disappeared. The author is of the opinion that, from the above work, it would appear that there are changes in the blood and tissue fluids in the reaction and that there is a substance present in the body, the appearance of which precedes the tissue changes. The change is usually associated with precipitin titre, but not necessarily so.

He discusses work done with visible antigens in which it was shown that there is a decreased rate of absorption of antigen from the site of injection. He also discusses work attributing the reaction to the reticulo-endothelial system. By a blockage of this system, it was shown that the reaction was repressed or even extinguished for a short period. This, he states, shows that phagocytes, or connective tissue cells, might be hyperergic during sensitization.

A description is given of work in which the reaction was observed directly in a frog's mesentery and also of experiments in which a reaction was obtained in sensitized animals by using cantharidin or xylol ; these substances (reagents) showed that the reaction is probably not a specific one. The author applied adrenalin directly to the mesentery of a sensitized animal and observed a diminution in the duration of the response, but little change in blood pressure. He concludes, therefore, that the irritability of the nervous system is diminished in the Arthus phenomenon. To add to the evidence *Bacterium coli*, as antigen, was added to a healthy and to a sensitized mesentery. The normal effect was observed in both, but the action of adrenalin disappeared in the case of the healthy mesentery, while

it persisted in the sensitized one. In the normal animal, death occurred in seven hours with a progressively decreasing blood pressure, while the sensitized animal lived 21 hours and the blood pressure remained at its normal level. This shows that the arteries lose their tendency to dilate and that the terminal vessels lose their contractibility. This leads, as in the ARTHUS reaction, to long and circumscribed inflammation which the author believes to be due to a decreased response of the nervous system probably brought about by a very complex mechanism.

In conclusion, the changes on the first injection are :—(1) an increased precipitin titre ; (2) a diminution in the irritability of the nervous system and (3) functional alteration in the cells of the tissue.

The author holds that the theory of the interaction of antigen and antibody at the injection site is not sufficient to account for the phenomenon as it is a pathological rule that the entire organism plays a greater or lesser part in such a reaction. Similarly, the view that it is entirely a hyperergic reaction is erroneous, as the action on the nervous system is only hyperergic in that it resists the tendency to paralysis by the antigen. The mesenchyme theory cannot be accepted either, as the substances used to block it were also capable of blocking the nervous system.

He refers to the experiments in which the second dose was given intravenously and in which an endocarditis resulted, indicating the presence of a general as well as of a local reaction.

Finally he draws attention to the modern tendency to classify certain pathological phenomena (urticaria, certain types of exanthemata, general, and rheumatoid arthritis) as types of " sensitization."

The author concludes by expressing the opinion that correlation of the work indicates that the explanation does not lie in serological, morphological, or physiological spheres, but in a combination of all three.—W. NAIRN.

FRIEDBERGER, E., & GURWITZ, I. (1931). Weitere Beiträge zum immunologischen Verhalten des Normalserums. IV. Der quantitative Komplementgehalt des normalen Meerschweinchens in verschiedenen Lebensperioden. **[Further Contributions to the Immunological Behaviour of Normal Serum. IV. The Complement Content of Normal Guinea Pigs at Various Periods of Life]**.—*Zschr. Immun.-Forsch.* **72.** 164-169. 1 table. [2 refs.]

Sera from 30 guinea pigs weighing from 150 to 600 g. were compared as regards complement content. The results are tabulated and show that, although marked differences were observed, they were wholly independent of age or weight. The authors note that this is in contrast to the amboceptor and agglutinin content of normal human or rabbit serum, which is connected with the stage of development.

—A. W. STABLEFORTH.

BORY, G. (1931). Csöaggutinácio és cseppaglutinácio. **[Tube Agglutination and the Drop-Agglutination Test]**.—*Allategészségügy.* **11.** 70-72.

The author points out the reasons why the use of agglutination tests is as a rule disregarded by practitioners, in spite of the fact that the so-called drop-agglutination test for the detection of *Brucella abortus* infections in cattle may easily be practised even under field conditions. This method, though well known and widely used in the laboratory, has often been said to give unreliable results. The author made parallel tests for *Br. abortus* antibodies with 203 cattle sera, using both the drop and the tube agglutination test, and found that, in dilutions up to 1 : 200, the two tests gave quite uniform results in all cases.

—A. KOTLÁN (BUDAPEST).

AUGUSTINE, D. L., & THEILER, H. (1932). **Precipitin and Skin Tests as Aids in Diagnosing Trichinosis.**—*Parasitology*. **24.** 60-86. 1 text fig., 2 figs. on 1 plate, 6 tables. [14 refs.]

These experiments were carried out to determine the value of the skin tests and precipitin tests described by BACHMAN for the diagnosis of trichinella infection in man and in swine. The antigen was prepared according to BACHMAN's method from dried and powdered larvae obtained by peptic digestion from the muscles of experimentally infected guinea pigs and extracted in Coca's solution. Tests were carried out on 9 guinea pigs, 14 rabbits, 70 pigs and 140 human subjects and very satisfactory results were obtained. The precipitin test gave positive reactions in dilutions of 1 : 1,000, the only non-specific reactions observed being those in man following the use of quinine.

The skin reaction in pigs was carried out on the inner surface of the hind leg and proved to be of the immediate type. Within five minutes of the injection of 0·1 c.c. of the solution of antigen, a red line appears at the periphery of the weal which grows to two or three times its original diameter in 30 minutes. Non-specific skin reactions were obtained with dilutions of 1 : 100, 1 : 1,500 and 1 : 5,000, but not with 1 : 10,000.

One pig of a number tested on a certain farm gave positive reactions and was afterwards purchased in order to confirm the diagnosis by microscopic examination. Over 80 preparations were made from the most suitable muscles, but no larvae were found. The muscles were then ground and digested in 0·4 per cent. pepsin and 507 larvae were recovered indicating that the skin and precipitin tests are far more accurate than muscle examination.—E. L. TAYLOR.

STROEM, A. C. S. (1931). **Cutaneous Hypersensitiveness in Guinea-Pigs Infected with *Brucella abortus*.**—*J. Infect. Dis.* **48.** 167-175. 2 tables. [12 refs.]

In a small number of tests the author found that guinea pigs artificially infected with different strains of the *Brucella* genus reacted to the cutaneous test with abortin whether lesions of the disease were visible on autopsy or not. Reactions did not occur when guinea pigs received heat-killed vaccines or when a mixture of vaccine and kieselguhr was used. Abortion infected guinea pigs did not react to tuberculin, while tuberculous guinea pigs reacted slightly to abortin.

—H. G. LAMONT.

I. ALLEN, H. R. (1931). **The Relationship of Glycerine in Veal Broth to the Potency of Tuberculin.**—*2nd Rep. Direct. Inst. Anim. Path. Cambridge*. pp. 184-193. 7 text figs. [2 refs.]

II. SEIBERT, Florence B., & MUNDAY, Betty. (1932). **The Chemical Composition of the Active Principle of Tuberculin. XV. A Precipitated Purified Tuberculin Protein Suitable for the Preparation of a Standard Tuberculin.** —*Amer. Rev. Tuberc.* **25.** 724-737. 5 tables. [16 refs.]

I. An actively growing strain of the tubercle bacillus was grown on veal broth containing amounts of glycerol varying from 0 to 5 per cent. Three fluids, concentrated to one tenth, were prepared from each batch as follows :—(1) the tuberculin was steamed, filtered and concentrated ; (2) the tuberculin was concentrated without a preliminary filtration and (3) the clear fluid beneath the film was concentrated. Each product was tested on infected guinea pigs and calves. In the guinea pigs there was a distinct increase in the skin reactions corresponding with the glycerol content of the tuberculins whereas in calves the glycerol had no apparent effect upon the potency of the products. On the other hand, the various methods of concentration gave different results in the calves, but not in the guinea pigs.

II. The authors have already described methods of preparing relatively large quantities of pure protein from the growth products on Long's synthetic medium by precipitation with ammonium sulphate or by ultrafiltration. In this paper they discuss the elaboration of a tuberculin, freed from contaminating substances and consisting only of the active principle in known amounts, by a preliminary ultrafiltration followed by precipitation with trichloracetic acid. They state that the nitrogen content of the final precipitates was between 14·6 and 15·4 per cent., while the polysaccharide was only from 1·7 to 2·0 per cent.

When standardized on sensitized guinea pigs, these tuberculins had a potency such that approximately 0·0005 mg. contained one minimum skin dose. They also produced satisfactory dermal reactions in tuberculous patients.

Some preliminary tests suggested that stock solutions of these proteins were comparatively stable at low temperatures.—R. E. Glover.

I. Heidelberger, M., & Kendall, F. E. (1931). **Specific and Non-Specific Polysaccharides of Type IV Pneumococcus.**—*J. Exp. Med.* **53.** 625-639. 3 tables. [12 refs.]

II. Dubos, R. (1932). **Factors affecting the Yield of Specific Enzyme in Cultures of the Bacillus decomposing the Capsular Polysaccharide of Type III Pneumococcus.**—*Ibid.* **55.** 377-391. 5 tables. [4 refs.]

III. Goodner, K., Dubos, R., & Avery, O. T. (1932). **The Action of a Specific Enzyme upon the Dermal Infection of Rabbits with Type III Pneumococcus.** —*Ibid.* 393-404. 3 tables, 2 charts. [10 refs.]

I. The authors give full details of the preparation and characters of three nitrogen-containing polysaccharides which they have obtained from autolysed cultures of Type IV pneumococcus (one of the subdivisions of Group IV made by Cooper, Edwards and Rosenstein). One is a type-specific carbohydrate which, however, differs markedly from those of Types I, II and III and somewhat resembles chitin in its general structure. The second is chemically similar, but without specific function. The third is the C substance, or species-specific polysaccharide, of Tillet, Goebel and Avery, and its presence has made possible some extension of their data.

II. An improved method is described for the preparation, concentration and purification of a bacterial enzyme capable of decomposing the capsular polysaccharide of Type III pneumococcus [see this *Bulletin.* **2.** 212]. Several cases are described in which the living micro-organism and the enzyme already free in the medium compete for the specific substrate. The cultural conditions must therefore be such that the capsular polysaccharide is completely decomposed before any appreciable amount of free enzyme is released into the medium. Growth and enzyme production were stimulated by yeast extract and by increased aeration. Emphasis is laid on the fact that, so far, appreciable amounts of the specific enzyme have been obtained only when the capsular polysaccharide itself, or the aldobionic acid derived from it, was present in the medium.

III. The enzyme described in II, when injected intravenously in sufficient amounts, is capable of bringing about an early and favourable termination to the dermal infection of rabbits with a strain of Type III pneumococcus which was ordinarily fatal. The mortality rate was reduced from 95 to 5 per cent.

The results yield further evidence that the capsular substance is of great importance in pneumococcus infection because, in so far as is known, the only action of which the enzyme is capable is that of decomposing the capsular polysaccharide.—A. W. Stableforth.

STILLMAN, E. G. (1932). **Reaction of Rabbits following Inhalation of Type III Pneumococci.**—*J. Infect. Dis.* **50.** 542-549. 1 table, 2 charts. [7 refs.]

The findings are in contrast to those previously obtained with pneumococci of Types I and II, both as regards the distribution of the organisms at various time intervals after spraying and as regards the production of agglutinins and protective antibodies.

In the case of inhalation of virulent Group III pneumococci, the organisms tend to remain localized in the lungs for a considerable period; early invasion of the body, as evidenced by recovery of pneumococci from the liver, spleen, kidney or blood, does not occur. Later invasion of the blood is followed by fatal septicaemia. No type-specific antibodies could be demonstrated following repeated inhalation of avirulent S pneumococci or in those animals that survived repeated inhalation of virulent S pneumococci. The mere presence of pneumococci in the lower respiratory tract is, therefore, apparently not sufficient to stimulate the development of type-specific agglutinins and protective antibodies; deeper penetration is necessary.—A. W. STABLEFORTH.

I. UNGAR, J., & HALMOS, R. (1932). Ueber den Hämolyseeffekt. [**On the Haemolysis Effect**].—*Zlb. Bakt. I. (Orig.).* **124.** 550-555. 2 tables. [9 refs.]

II. RIMPAU, W., & SCHNEIDER, G. (1932). Kork und Komplementbindung. [**Cork and Complement-Fixation**].—*Ibid.* 568-571. [2 refs.]

I. Earlier workers have reported that typhoid bacilli which have been acted on by bacteriophage are able to produce clearing in blood agar plates and SONNENSCHEIN, who called this "Hämolyseeffekt," emphasized its practical significance in the recognition of *Bact. typhosum.* The authors have examined the properties of 64 strains of typhoid bacilli after treatment with a mixed typhoid phage or an anthrax phage, the lytic action of which showed a close parallelism as regards the strains used. Treatment with the anthrax phage produced the "haemolytic effect" in only about 90 per cent. of cases; the mixed typhoid phage was somewhat less effective and in certain cases complete lysis was associated with absence of haemolytic effect.

By means of the same phages they were also able to produce the effect in the case of some strains of *Bact. paratyphosum* A, *Bact. coli*, *Staphylococcus*, and with certain other organisms.

II. Rimpau and Schneider find that, contrary to the report of PLAUT, the contact of blood serum with cork, as it occurs in the sending of blood samples, does not result in an extraction of tannic acid sufficient to interfere with the complement-fixation reaction. Moreover, human serum binds tannic acid in detectable amount and thereby hinders its action on complement.—A. W. STABLEFORTH.

DISEASES, GENERAL.

GILLAIN, J. (1932). Cirrhose hépatique des bovidés au Kivu. [**Hepatic Cirrhosis of Cattle at Kivu**].—*Ann. Méd. vét.* **77.** 212-215. [1 ref.]

This short article is entirely clinical in nature. It describes a disease occurring on the north-west shores of Lake Kivu in Central Africa which has killed off some few cattle, eight cases being mentioned. Two cases are mentioned in detail, the one being a cow of indigenous variety and the other a newly-weaned calf.

The main symptoms are inappetence and a persistent diarrhoea followed by emaciation, a subnormal temperature and a weak and thready pulse. After running a course of about a month the animal collapses and dies in a state of decubitus

The liver shows marked cirrhosis at *post-mortem* examination. There is an early mononuclear infiltration of the interlobular septa followed by an increase of connective tissue. The fibroblasts gradually invade the intralobular spaces and the columns of liver cells are broken up by the fibrous tissue formed. Foci of regenerating liver cells are also described. Other changes are a chronic interstitial myocarditis and a marked ascites.

The author records his failure to establish the presence of any possible parasitic cause of the deaths. He then draws attention to the similarity between this condition and one described by THEILER [(1918). *7th & 8th Reps. Direct. Vet. Res. Union of S. Africa.* pp. 59 and 107.] where crotalaria (a leguminous plant), is cited as a possible cause.

[In South Africa atrophic cirrhosis of the liver is recognized in dunsiekte of horses, Maltenò disease of cattle and " waterpens "—chiefly of goats. These diseases have been associated with poisoning from *Crotalaria dura* and *Senecio latifolius*. Extensive forced feeding with these plants produces cirrhosis of the liver but the case is not really convincing against either plant as the cause of the above diseases].—E. J. PULLINGER.

MAGALHAES, O. (1931). A Peste dos Polmoes. [English translation uncertain : polmoes=abscess].—*Mem. Inst. Oswaldo Cruz, Rio de Janeiro.* **25.** 317-321. [2 refs.]

The paper is a collection of data which were omitted from, or have been elucidated since, the publication of the researches carried out at the Institute upon a virus disease of bovines.

The author discusses the fact that, up to the present, 24 organisms have been associated with the causation of the lesions of the disease and suggests that the virus lowers the animal's vitality and allows invasion of the body by any micro-organism of a pathogenic nature which happens to predominate in the alimentary tract.

An experiment on an animal is recorded in which emulsified infective ticks filtered through a Chamberland 4 filter failed to set up the disease in a calf.

Atypical lung lesions of a miliary and caseous nature respectively are described and their resemblance to those of tuberculosis emphasized.

An attempt is made to classify some of the organisms isolated.

[According to the author's earlier work, the disease dealt with attacks bovines, is primarily caused by a filtrable virus and, pathologically, is characterized by the presence of numerous abscesses, in almost any organ or tissue, but most commonly in the skin.]—R. S. ROBERTS.

I. BRANDLY, C. A. (1932). **An Acute Infectious Omphalitis (Inflammation of the Navel) of Baby Chicks.**—*Poultry Sci.* **11.** 279-282. [5 refs.]

II. VOLKMAR, F. (1932). **Apoplectiform Septicemia in Turkeys.**—*Ibid.* 297-300. [19 refs.]

I. This condition was noticed in chickens from the time of hatching until 72 hours afterwards. *Bacillus mycoides*, *Clostridium sporogenes* and *Cl. tertium* were isolated from infected birds. The inoculation of these organisms into presumably susceptible chickens did not reproduce the condition.

II. The symptoms and *post-mortem* findings associated with this condition are briefly described. Examination of the heart blood is stated to have revealed the presence of *Streptococcus capsulatus gallinarum*. The author does not appear to have attempted to reproduce the disease in turkeys.—NORMAN DOBSON.

FAIRBROTHER, R. W., & HURST, E. W. (1932). **Spontaneous Diseases observed in 600 Monkeys.**—*J. Path. & Bact.* **35.** 867-873. 4 figs. on 2 plates. [7 refs.]

In their investigation of poliomyelitis the authors conducted autopsies on 605 sexually immature monkeys (chiefly *Macacus rhesus*) and in this paper they recount their findings. The only frequent diseases were tuberculosis and dysentery, other serious ailments being uncommon. Tuberculosis, which occurred in 50 monkeys, was in most cases acute, the respiratory tract forming the chief portal of entry. Secondary intestinal infection and generalized blood infection sometimes occurred, but lesions of the nervous system were rare.

There were ten definite cases of bacillary dysentery, apart from several clinically suspicious cases in which the organisms were not isolated. No cases of rickets or of cage-paralysis were encountered.

Cirrhosis of the pancreas was present in a callithrix monkey. Amongst the minor abnormalities observed were :—(1) " calcification " of the basal ganglia ; (2) the occurrence of " calcified bodies " in the adrenals at the junction of the cortex and medulla in 71 out of 111 consecutive cases and (3) extreme fatty infiltration of the liver at the point of insertion of the ligamentum teres in 26 out of 90 consecutive cases.—GWILYM O. DAVIES.

KINTNER, J. H., & HOLT, R. L. (1932). **Equine Osteomalacia.**—*Philippine J. Sci.* **49.** 1-89. 16 text figs., 24 plates, 20 tables. [106 refs.]

An article recording extensive research by the Army Research Board at Manila, and providing a comprehensive review of relevant data from all parts of the world.

The disease sometimes developed in healthy horses within five months of arrival in the Philippines. The use of X-rays is recommended for early diagnosis. The term osteomalacia is used on the grounds that, although osteofibrosis and inflammatory changes may occur concurrently, the main change is replacement of bone by osteoid tissue. Occasional occurrence is recorded in mules.

Clinical appearance, macro- and micropathology are discussed and exceptionally extensive data provided on blood chemistry. The noteworthy blood changes were slightly reduced calcium and somewhat raised inorganic phosphorus [contrast the low phosphorus of bovine osteomalacia, this *Bulletin*. **2.** 173]. Osteomalacic bones showed low ash content and low tensile strength.

The authors incriminate mineral imbalance as cause of the disease. Locally grown hay and grass showed low calcium (0·12 to 0·2 per cent. calcium oxide) and phosphorus (0·23 to 0·29 per cent. phosphorus pentoxide). Equine osteomalacia was produced experimentally on a ration of oats, hay and green grass, with a ratio calcium oxide : phosphorus pentoxide of 1 : 2·9. It was not produced within nine months on a ratio of 1 : 1·9. The disease was successfully controlled in practice by correcting the dietary ratio to about 1 : 1.—H. H. GREEN.

GILL, D. A. (1932). **Pulpy Kidney Disease of Lambs.**—*New Zealand J. Agric.* **45.** 332-340. 6 figs., 3 tables. [7 refs.]

Reference is made to other workers on this subject and to previous articles by the same author.

An organism was isolated similar to *Clostridium ovitoxicum* found in intestines of sheep by BENNETTS of Western Australia and this organism was compared for toxin-antitoxin neutralization with four others :—*Cl. welchii*, the lamb dysentery bacillus, *Cl. paludis* and *Cl. ovitoxicum*. Because the Australian *Cl. ovitoxicum* did not liquefy serum and the New Zealand strain did so very strongly, it was suggested

that the name of the organism of New Zealand pulpy kidney disease be *Cl. ovitoxicum* var. N.Z.

Experimental work performed in production of the disease showed that there was a toxin in the gut of affected lambs which, if placed in the blood stream of healthy lambs, caused death with all symptoms of pulpy kidney disease.

This toxin was neutralized by antitoxin prepared from *Cl. ovitoxicum* Bennetts and the lamb dysentery bacillus, but not by *Cl. welchii* nor *Cl. paludis*.

Vaccination and antitoxic serum trials on lambs carried out together with proper controls showed that, whereas vaccination was practically useless, antitoxin was distinctly advantageous, deaths being reduced from 2 to 0·3 per cent.

—C. S. M. HOPKIRK.

DOYLE, L. P. (1932). **Suckling Pig Losses and Anemia.**—*Purdue Univ. Agric. Expt. Sta. Circ.* No. 188. pp. 8.

This is a description in semi-popular language of anaemia in piglets, which is prone to occur in the first weeks of life when the sow has been kept confined in a building during gestation. If the sow and litter are kept indoors, there is still further risk of disease. Preventive measures are necessary, i.e. allowing the sow and her litter access to grassland, blue grass sod being particularly recommended.

It has been found experimentally that anaemic piglets are very liable to contract necrobacillosis, particularly of the snout (so-called bullnose), whilst piglets of the same litter, allowed access to grass and open air, resist the infection. The scientific details of the experiments are not given in this circular.—J. E.

RANGANATHAN, S. (1932). **Researches on 'Stone.' Part XIII. X-Ray Diffraction Studies of Calculi.**—*Ind. J. Med. Res.* **19.** 1153-1160. 5 figs. on 1 plate, 3 tables. [13 refs.]

The paper describes X-ray diffraction studies of human and bovine vesical calculi, gall stones from human beings, pure uric acid and cholesterol ; specimen photomicrographs of typical diffraction patterns are provided. In general the main substances that constitute calculi are deposited in the crystalline state ; the uric acid in human stones and the calcium carbonate in cattle stones are both in this state. The ring structure of gall stones is explained and an explanation is offered for the existence of the pigmented and non-pigmented varieties.

—H. H. GREEN.

STUBBS, E. L., & FURTH, J. (1932). **Anemia and Erythroleucosis occurring spontaneously in the Common Fowl.**—*J. Amer. Vet. Med. Ass.* **81.** 209-222. 10 figs. on 2 plates, 3 tables. [15 refs.]

Erythroleucosis is defined as a transmissible disease of the fowl characterized by a severe anaemia with numerous lymphoid cells, presumably precursors of erythrocytes, in the peripheral circulation and by a selective accumulation of these lymphoid cells in the bone marrow and spleen and in the capillaries of many other organs. The authors have recently shown that erythroleucosis and myeloid leucosis occur among passages of a single transmissible strain, but have found no evidence to support the view of ELLERMANN that lymphoid leucosis is caused by the same agent.

After a brief discussion of the cases of spontaneous anaemia in fowls described by BEDSON and KNIGHT and by BAYON, the authors describe an outbreak of anaemia in a single flock. Five birds were affected and all were carefully examined. Only one bird showed typical lesions of erythroleucosis ; in the others the blood picture was that of severe anaemia. Detailed descriptions of the blood and of the macro-

scopic and microscopic appearances of the other tissues are given.

Transmission experiments were successful, the condition produced in the experimental birds being erythroleucosis in some cases, myeloid leucosis in others.

The relation of chronic spontaneous anaemia to erythroleucosis is discussed, and it is pointed out that there are no reliable criteria for the differentiation from ordinary anaemia of severe anaemia, transmissible by a filtrable agent. The authors suggest that the failures to transmit the condition recorded by other authors were due to the use of an inadequate number of experimental birds which were, moreover, full-grown and, therefore, more resistant to infection.

A brief summary is given of the more important characters of the transmissible agent of erythroleucosis.—C. McG.

GIBBENS, J. (1931). **Acute Aseptic Meningitis.**—*Lancet.* **221.** 12-15. [14 refs.]

The author reviews the literature concerning a peculiar type of meningitis, resembling tuberculous meningitis, in children. Cases have hitherto been recorded under the names of aseptic purulent meningitis (SCHIFF), acute idiopathic benign serous meningitis (ANDERSEN and WULFF) and epidemic meningitis serosa (ECKSTEIN). It is characterized by (1) an acute onset ; (2) meningeal changes in the cerebrospinal fluid, although the fluid is sterile on culture ; (3) a uniform clinical symptomology ; (4) a relatively short benign course without secondary complications ; (5) absence of connection with any known infectious meningeal disease ; and (6) absence of local infection such as otitis media.

Gibbens discusses the symptoms of the condition and gives the results of the examination of the cerebrospinal fluid. The changes include increased pressure, cell counts varying from 60 to 1,500 with an average of about 200 ; the cells are mainly of the lymphocyte type, but, at the onset of the disease, polymorphs may predominate. Prognosis is favourable.

Its relationship to other nervous diseases is discussed and a detailed report of three cases is given.—J. R. M. INNES.

PUBLIC HEALTH.

DE VINE, B. (1932). **The Law Relating to Meat Inspection.**—*Vet. Rec.* **12.** 928-935.

This paper, read before the 43rd Annual Congress of the Royal Sanitary Institution held at Brighton in 1932, is an excellent summary of our laws on meat inspection and at the same time it plainly sets forth their many defects and shortcomings. A list of the laws dating from 1847 to 1928 is given and it is asserted that the law is unnecessarily spread over too many acts and orders and is not uniform. Sections 16 to 19 of the Public Health Act of 1875, dealing with the condemnation and seizure of food, are fully explained and it is shown how one-sided they are and that often they may be unfair to the meat trader.

The qualifications—or often lack of suitable qualifications—of a meat inspector are criticized and the necessity of qualified veterinary surgeons being recognized for this work is urged. Comparison is made between the state of affairs existing in England and in Scotland, showing the greatly superior position of the latter.

The difficulties of the disposal of unsound meat or meat products which, if surrendered, are still the property of the butcher, is explained and the unsatisfactory legislation regarding the methods of obtaining an order from a justice of the peace before meat can be destroyed is discussed.

Finally, the regulations regarding imported meat are enumerated and the

necessity " for the passing of a special Public Health Act in connection with food supplies in England and Wales " is advocated. It is stated that " The Public Health Act of Scotland and the regulations made thereunder are so superior to the present legislation in England that it would form a good foundation for a new Act in which all the more useful clauses of the past Acts could be co-ordinated."

—D. S. RABAGLIATI.

BROCHET, L. (1932). pH et inspection des viandes. (Viandes fièvreuses, viandes fatiguées.) [**pH and the Inspection of Meat (Fevered and Fatigued)**]. —*Rev. gén. Méd. vét.* **41.** 201-202. [1 ref.]

In a previous article [(1930). *Rev. gén. Méd. vét.* **39.** 465.] the author described pH colour tests on horse flesh. In the present work he states that the method might be usefully employed in general inspection and he has endeavoured to apply it to differentiate the meat of healthy, fevered and fatigued animals. He describes the method and the composition of the solutions used and then gives a scale of the tints for comparative purposes. In the tests carried out it appeared that, compared with the results in healthy animals, the method gave more useful indications for the meat of fatigued than of fevered animals. The author adds that during hot weather, when putrefaction is added to the fevered condition, the pH itself is of no value. On a careful consideration of the work done and of the difficulties in carrying out the tests in ordinary meat inspection, especially where a laboratory is not available, he is of the opinion that the method, though of scientific interest, would be of little practical use.—T. DUNLOP YOUNG.

HÜBNER, K. (1932). Zur grünfarbung pathologischer Prozesse in den Organen unserer schlachtbaren Haustiere durch lokale Eosinophilie. [**Localized Eosinophilia causing Green Discolouration in the Organs of our Food Animals**].—*Zschr. Infektkr. Haust.* **42.** 40-66. [64 refs.]

The author made a systematic histological examination of lesions obtained from animals killed for food purposes at the Berlin abattoir and found that green discolouration of flesh or of body organs was associated with a great local increase in eosinophile leucocytes. This eosinophilia was associated with the following conditions :—cysticercosis and sarcosporidiosis of muscle, dead echinococcus cysts, *Cysticercus tenuicollis* cysts and liver flukes in liver and lungs ; strongyles and an obscure condition in the lungs of calves ; changes in the mesenteric, bronchial and mediastinal, mammary and regional lymph glands ; lesions of warble fly larvae and mycosis fungoides of the skin and subcutis.

These conditions appeared in cattle, horses, swine and sheep and are described in detail.—J. E.

LEA, C. H. (1931). **Chemical Changes in the Fat of Frozen and Chilled Meat. Part III. Frozen Bacon.**—*J. Soc. Chem. Indust.* **50.** 343-349. 2 figs., 7 tables.

All fats tend to become rancid and more or less altered in colour due to oxidization and the growth of micro-organisms, the latter depending upon the temperature in which the article is kept. The experiments carried out by the author were undertaken to discover the cause of deterioration and to follow the chemical changes occurring in the fat during cold storage and subsequent hanging at ordinary temperature. He also wished to ascertain the effect on the keeping qualities of the fat of :—(1) smoking, (2) variations in composition of the animals' food, e.g. the addition of cod liver oil to the diet and (3) immediate cooling of the pork at 5°C. (40° F.) instead of at the usual temperature.

The following is a brief summary of the results :—

(1) Smoking.—The effect of smoking on bacon after storage at –10°C. is to arrest the progress of superficial oxidization for a period and there is some evidence that oxidization in the interior of the fat may also be somewhat retarded. (2) Variation in composition of diet.—The addition of cod liver oil in small quantities to the diet was without effect on the iodine value of the fat of the bacon, but it appeared to have a somewhat adverse effect on its keeping properties. (3) Immediate cooling of the pork at 5°C.—When stored at a temperature of –10°C. the exposed surface of the fat oxidized comparatively rapidly, reaching active oxygen content of from 30 to 60 c.c. [as N/500 thiosulphite per g. of fat] in 152 days without, however, developing any appreciable yellow colour. At 15°C., on the other hand, the bacon was found to become yellow on the surface and (after cold storage) the interior of the fat also, sometimes, became yellow. On cooking, the oxidized portions of the fat had an unpleasant flavour.—T. Dunlop Young.

Gill, D. A. (1932). **Boric Acid as a Preservative of Milk Samples for Routine Bacteriological Examination.**—*Vet. J.* **88.** 284-289. 5 tables.

Experiments were carried out in New Zealand to test the method suggested by Traum and Hart of preserving milk samples sent to the laboratory for the examination for tubercle bacilli or other contaminations.

A series of experiments were carried out to test the method when sterile bottles were used for the samples and all precautions to prevent outside contamination were taken, with and without placing the samples on ice for a period of hours first. Similar experiments also were conducted when merely washed bottles were used and the milk was collected by the cowmen without scrupulous care.

It was found that the exact quantity of boric acid used was not material when it ranged at approximately 1 per cent. The author found that " When approximately 1 per cent. boric acid is added to a sample of milk at the time it is drawn, one can obtain a fair idea of the original flora even after a lapse of five days at summer temperatures. . . . . Contaminants will be present if precautions are not taken to preclude them, but since they do not multiply they are not of much consequence so long as reasonable cleanliness is observed at the time of sampling."—D. S. Rabagliati.

Isaacs, M. L., & Zeiber, I. (1932). **A Comparative Study of Milk in Bottles with Single and Double Caps.**—*Amer. J. Hyg.* **16.** 806-822. 5 figs., 4 tables.

The authors describe the various ways by which milk in bottles can be contaminated during transport to the consumer, and the varying temperatures to which it may be subjected. Elaborate tests were made during April, May and June of milk in bottles having the two types of caps. The experiments included the standard methods for bacterial count, the *Bact. coli* test and also tests for anaerobic organisms. The milk in both types of bottles was subjected to the same conditions all through the experiments. In the laboratory the milk samples were divided into two classes, viz. the city supply and the country supply. From the detailed charts and tables it was conclusively found that (1) the bacterial count of milk in bottles having double caps in the city supply was lower than that of the country supply with double caps and (2) the bacterial count of the city supply with single caps was lower than that of the country supply with single caps. Many samples were examined for *Bact. coli*, 1 c.c. amounts of the upper cream of both varieties being used, and in almost every case the organisms identified were of the faecal type. Direct contamination is not always the one and only method by which deleterious matter gains access to the bottle. It is maintained that city

contamination by human *Bact. coli* is more probable and more dangerous than contamination by material of animal origin. Owing to the great variability in the amount of contamination received by individual bottles and the difficulty in tracing milk-borne diseases definitely, it is imperative that all possible agencies of contamination should be explored.

The changes to which milk is subjected during transport cause contraction and expansion, and this may cause fluids to be extruded or sucked in round the cap. It was further found that bacteria were much more numerous on the inside of the single cap bottle than in a bottle with a protected cap cover. *Bact. coli* was also more frequently present on the single cap, the percentage being 47·5 as regards the single cap against 10 per cent. for the protected cap.

The bacterial counts of the milk protected by single cap type were higher than those protected by the double one.

It appears to have been conclusively proved that the single cap is definitely a menace to the milk-consuming public.—F. W. Medlock.

Fredericia, L. S., & Hansen, A. P. (1931). **Influence of Sterilization and Stassanisation on Vitamins of Milk.**—*Internat. Dairy Congress. Suppl.* pp. 73-75. 6 tables.

Experiments, conducted on rats by Prof. Fredericia using stassanized milk, and control samples of same milk untreated, showed that the contents of vitamins A and B were not affected by the process. The experiments were not so definite with regard to vitamin C.

The author considers that Stassano's method is well suited for the treatment of city milk supplies.—W. Nairn.

Golledge, S. V. (1932). **Streptococcus Infection in Man caused through the Medium of Milk from Infected Udders.**—*Vet. Rec.* **12.** 1499-1501. [6 refs.]

An outbreak of acute streptococcus disease among the personnel of a small farm is described. Four persons were affected of whom two, viz. the farmer and one of his cowmen, died within a few days. Haemolytic streptococci were isolated from :—(1) the tissues of the farmer after death ; (2) a milking smock worn by certain of the affected persons and (3) the milk of two of the 38 cows comprising the herd. The outbreak is of particular interest because the streptococci from all these sources proved to be identical in their cultural and serological reactions, belonging to scarlatinal Type I (F. Griffith, 1926). The very strong presumption is that the two cows were infected, through the agency of a milker, with haemolytic streptococci of human origin and that the subsequent human cases were reinfected from the milk of these two animals. The milk of the infected cows, so long as it appeared normal, was added to the mixed milk of the herd, but there was no chance of the outbreak extending because the supply was heated before distribution.

—F. C. Minett.

I. Mazé, P., & Césari, E. (1931). La destruction du *Bacillus abortus* dans le lait et les fromages par la fermentation lactique. **[The Destruction of *Brucella abortus* in Milk and Cheese by Lactic Fermentation].**—*C. R. Soc. Biol. Paris.* **108.** 630-632.

II. Gwatkin, R. (1931). **Bang's Disease in Relation to Milk.**—*20th Ann. Rep. Internat. Ass. Dairy & Milk Insp.* pp. 223-230. 1 table. [20 refs.]

I. Results of experiments in which *Br. abortus* and a lactic ferment (similar to that used in making cheese) were sown simultaneously in milk and incubated at 37° C., show that *Br. abortus* was destroyed in 48 hours by the acidity produced. There is, therefore, no danger of infection to human beings through eating fresh

cheese, which is usually kept in press for five days before sale.

II. The author states that cows which have actually aborted and those which are positive to the agglutination test give a smaller milk yield than uninfected animals. The udder was found to be infected in a high percentage of cows whose blood sera gave titres of over 1 : 100 and tests with whey proved useful for detecting such infection.

Br. abortus was recovered from the milk of two herds producing certified milk. Samples of pasteurized milk from badly infected herds were examined with negative results and a few strains of *Br. abortus* tested by the author were destroyed after exposure of 10 to 15 minutes to a temperature of 140° F.—S. J. Edwards.

Lehnert, E. (1932). Die schwedische Staatskontrolle der Ratinpräparate 1910-1932. [**The Swedish State Control of " Ratin Preparations " 1910-1932**].—*Zschr. Fleisch- u. Milchhyg.* **42.** 357-358.

The " ratin preparations " consist of a bacterial culture and a standardized squills preparation called " ratinin." In connection with feeding experiments it is stated that, in about 83 per cent. of cases, total or almost total extirpation of rats was achieved. In 16 per cent. an important decrease in the rat population was attained whilst there was little or no effect in about 1·5 per cent. The preparations are controlled by laboratory examination and it is stated that both rats and mice like them and that they are relatively harmless to man and other animals for no case of disease or death had been observed in connection with the use of the preparations.—R. Lovell.

Munro, D., & Wright, R. (1933). **The Rabbit Pest and its Control.**—*New Zealand J. Agric.* **46.** 26-37.

The authors, who have had a life-long experience of control of rabbits, have written an article describing the various methods of dealing with the rabbit pest. They have given a number of poison recipes and the way to apply poison baits, the main poisons being phosphorized grain or pollard, and various strychnine baits. Fumigation methods are also dealt with. The article ends with a discussion on the formation of local rabbit boards to deal with the pest. There is considerable reliable information on methods of control.—C. S. M. Hopkirk.

THERAPEUTICS.

I. Luhrs, G. (1932). Ueber " Valvanol " als Desinfektionsmittel bei Tuberkulose. [**Valvanol as Disinfectant in Tuberculosis**].—*Zschr. Veterinärk.* **44.** 1-19. [10 refs.]

II. Kleinert. (1932). Carvaseptpaste als Desinfiziens und Desodorans für Hände und Arme. [**Carvasept as Disinfectant and Deodorizer for Hands and Arms**].—*Berl. tierärztl. Wschr.* **48.** 177-178. [5 refs.]

I. Valvanol, synonym matanol, is a preparation of chlorinated phenols and cresols held in solution by soap—a transparent yellow fluid miscible in all proportions with water.

The author tested its value as a disinfectant for bovine and avian types of *Mycobacterium tuberculosis*. He found that two hours exposure to 3 per cent. solutions in the case of bacterial suspensions, or to 5 per cent. in the case of sputum, sufficed to prevent subsequent growth in suitable media. In tests on guinea pigs and hens two hours at 5 per cent. concentration was sufficient to destroy the infectivity of bacterial suspensions, but with lung mucus even four hours exposure was uncertain.

II. Carvasept is a chlorinated carvacrol [1 methyl-4-isopropyl-2-hydroxybenzene (isomeric with thymol)] stated to have a disinfecting power 50 to 100 times as great as carbolic acid but to be only half as toxic. The paste referred to contains 0·1 per cent. of the crystalline carvasept made up with a non-fatty base. It is a pleasant cream with a thymol-like odour, is quickly absorbed by the skin and easily washed off with soap and warm water.

The author reports favourably on its use as an antiseptic and deodorant for the hands and arms in veterinary practice, particularly for rectal explorations and placenta removals.—H. H. Green.

Lominsky, I. (1932). Influence de la lécithine et de la cholestérine (en concentration correspondant à celle de ces substances dans la bile de boeuf) sur la biologie du bacille tuberculeux humain. [**The Influence of Lecithin and Cholesterol on Human Tubercle Bacilli**].—*Ann. Inst. Pasteur.* **49.** 194-219. [59 refs.]

Previous work on the effect of lipoids on tubercle bacilli is discussed. It is concluded that the effects of lecithin vary with its concentration. In the present work the effects of additions of lecithin and of cholesterol to a stock medium upon the growth and virulence of human tubercle bacilli is examined. These substances were added to a 5 per cent. glycerol broth potato medium in a concentration similar to that found in ox-bile, viz. lecithin 0·1 per cent. and cholesterol 0·07 per cent.

It was found that the growth of the organism was greatly stimulated by the presence of both lecithin and cholesterol and to a lesser degree by lecithin alone when compared with controls on the potato medium. The medium with cholesterol added alone, however, resulted in a retardation of growth.

The virulence of the organism, on the other hand, was enhanced for guinea pigs and mice by the addition of cholesterol whilst the presence of lecithin led to a diminished virulence.

These results are discussed at some length.—W. R. Wooldridge.

I. Sergent, E., Donatien, A., Parrot, L., & Lestoquard, F. (1931). Le traitement de la babésiellose bovine à *Babesiella berbera* par l'ichthargan. [**The Treatment with Ichthargan of Bovine** *Babesiella* [*Babesia*] *berbera* **Infection**].—*Bull. Soc. Path. exot.* **24.** 939-948. 4 figs. [2 refs.]

II. Donatien, A., & Lestoquard, F. (1932). L'Ichthargan dans le traitement des babésielloses bovines. [**Ichthargan in the Treatment of Bovine** *Babesiella* [*Babesia*] *berbera* **Infection**].—*Rev. vét. et J. Méd. vét.* **84.** 70-71. [1 ref.]

I. On the basis of experiments upon 25 cattle the authors conclude that ichthargan is a reliable remedy against *Babesia berbera* infection in doses of about 1 g. per 400 kg. live-weight.

Even after a single injection abatement of all symptoms was noted, with disappearance of piroplasms in a few days. The temporary persistence of icterus did not vitiate the general state of relief.

II. Of 29 natural cases and 6 experimentally produced by intravenous injection of 100 c.c. infected blood (*B. berbera*), 28 recovered after two intravenous injections of ichthargan at intervals of from 24 to 48 hours. Dosage was 1 to 1·5 g. per 200 to 400 kg. body-weight, given in 1 per cent. aqueous solution. The single failure was attributed to late diagnosis.

Of 6 untreated controls, 5 died and the sixth only recovered after prolonged severe illness.—H. H. Green.

MILLER, J. J., Jr., MCCOY, O. R., & BRADFORD, W. L. (1932). **Intravenous Treatment in Experimental Trichiniasis.**—*J. Amer. Med. Ass.* **98.** 1242-1245. 4 tables. [14 refs.]

From time to time success has been claimed for the intravenous administration of drugs as a treatment for trichiniasis in man. The experiments here reported were carried out on rabbits and on rats which had been heavily infected and the effect of the various drugs was observed by subsequently making counts of the trichinae in weighed portions of muscle from the treated animals and from controls. The following drugs were used :—neoarsphenamine, antimony and potassium tartrate, acriflavine base, rivanol, gentian violet, metaphen and Lugol's solution, but in no instance was there indication of any beneficial effect. The combination of severe trichiniasis and rigorous treatment resulted in greater loss than did either agent acting alone and it is concluded that this line of treatment is unlikely to prove of value.—E. L. TAYLOR.

ROARK, R. C. (1932). **A Digest of the Literature of Derris (Deguelia) Species used as Insecticides, 1747-1931.**—*U. S. Dept. Agric. Misc. Publ.* No. 120. pp. 86.

This is an extremely comprehensive literary review on the derris genus of plants and is composed from world-wide publications. After a short introduction, the bibliography is dealt with in alphabetical (author) order, each of the 456 titles being followed by a brief abstract. Insects important both to plant and animal husbandry are included for the purpose of the review, there being numerous references to the use of derris against warble flies and other insects detrimental to animal health.

There is a very good subject index and also a chronological index, the serial numbers of the references being shown opposite year dates.—J. E.

EASON, J. (1932). **The Arrest of Haemorrhage by Hypertonic Glucose Solution.** —*Lancet.* **223.** 1272. [1 ref.]

The author reports great success in the arrest of haemorrhage by the application of a 50 per cent. glucose solution in water. It is very effective when applied locally on gauze, etc., to bleeding areas, e.g. in epitaxis, cuts and bleeding gums and, when taken internally, in haematemesis in human beings.—J. E.

POISONS AND POISONING.

HORWOOD, R. E., & PUTNAM, G. W. (1931). **Ergot on Barley does not harm Cattle.**—*Michigan State Coll. Quart. Bull.* No. 14. pp. 84-85. 2 tables.

Feeding of 1 per cent. ergotized barley in the rations caused no effects on in-calf cows, which remained in excellent general health, gave birth to strong calves and cleansed normally.—G. D. LANDER.

JIRINA, K. (1932). Ueber die Wirkung der Salamanderalkaloide auf den Organismus des Pferdes. [**Effect of the Salamander Alkaloids on the Horse**].—*Berl. tierärztl. Wschr.* **48.** 37-39. [16 refs.]

The physiological properties of the alkaloids [salamandarine and salamandaridine] from the skin secretion of *Salamander maculosa* are well known but the author could find no references to their effect on the larger domesticated animals.

He conducted experiments on horses with the ulterior object of utilizing salamandrin (the crude product obtained by evaporation of the sweat procured

by electrical stimulation of the amphibian) as a diagnostic agent for nervous disorders and found that, although response to dosage was sometimes erratic, intravenous injection of 75 c.c. to 85 c.c. of a fresh 1 per cent. solution produced a brief characteristic excitation of reflex activities [fully described in the text] in healthy horses, and that horses suffering from disorders of the central nervous system (staggers, epilepsy) reacted more promptly and intensely.—H. H. GREEN.

PHYSIOLOGY.

SHEARER, G. D., & STEWART, J. (1931). **Some Biochemical Studies on the Blood of Sheep.**—*2nd Rep. Direct. Inst. Anim. Path. Univ. Cambridge.* pp. 86-120. 12 tables. [56 refs.]

An investigation to observe the effects of the injection of various substances upon the blood chemistry of the sheep, as compared with the recorded effects upon laboratory animals. A large variety of substances were injected including chemicals and gland extracts. In many of the experiments the number of sheep used was too small, when considered in conjunction with the results, to warrant the arrival at any definite conclusions. The paper does not lend itself to abstraction and should be consulted in the original.—HENRY DRYERRE.

GADSCHIEFF, S. S. (1932). Das Blutbild der Zebus. **[The Blood Picture of the Zebu].**—*Deuts. tierärztl. Wschr.* **40.** 550.

The author examined the blood of six healthy Persian zebu cattle (three steers, one bull and two cows) and found the average values to be the following :—erythrocytes 7,090,000 and thrombocytes 408,000 per c.mm. ; haemoglobin 50 per cent. ; leucocyte formula—lymphocytes 58·93 per cent., monocytes 4·47 per cent., neutrophile polymorphs 28·03 per cent., eosinophiles 8·89 per cent. and mast cells 0·5 per cent.—J. E.

VORONOFF, S. (1932). **Histological Evolution and Physiological Manifestations of Glandular Grafts.**—*Vet. J.* **88.** 299-303.

The author, in a lecture delivered at Algiers, summarizes the general results of gland grafting in man and animals, showing that grafted tissue continues in a large proportion of cases to survive in its new abode and to have a profound influence on the host. This was proved by the exhibition of histological sections of grafts removed after various intervals from human hosts.

Some clinical case records of grafted animals, including the bull " Jacky," are given. In old males grafted, a resultant invigoration is common, but a return of sexual potency is less likely.

[Translations of this paper were published in *Rec. Méd. vét.* **108.** 364. and in *Wien. tierärztl. Mschr.* **19.** 577].—J. E.

SZYMANOWSKI, W. T., & HICKS, R. A. (1932). **The Biologic Action of Ultrahigh Frequency Currents.**—*J. Infect. Dis.* **50.** 1-25. 5 figs., 3 tables. [36 refs.]

The modern vacuum tube oscillator has made possible the study of the action of short electric waves at frequencies up to 160 million per second, and with such technical progress biological research with this type of radiation has become increasingly important.

In the present paper it is shown that ultra-high frequency radiation (1·9 to 3·7 metres wave-length) is capable of producing definite attenuation of three major bacterial toxins—diphtheria, tetanus and botulinus in raw broth filtrates. Since

this effect was obtained without development of inimical temperatures a tentative theory is advanced to explain the action.

It is assumed that in non-symmetrical molecules the centre of positive charge does not coincide with the centre of negative charge, such a combination of two charges separated by a finite distance being termed a " dipole." If a fluid containing such molecules is subjected to an electric field the dipoles will orientate themselves magnetically, but because of the viscosity of the fluid there will be a time lag associated with absorption of energy. Since toxins are large molecular complexes and the bonds connecting components may be weak, it is possible that partial destruction occurs as the result of rapid agitation of the molecular dipoles and the resistance opposed to this motion by the viscosity of the fluid.

Details of technique and sketches of oscillator and cooling circuit for the toxin film are given.—H. H. Green.

Dry, F. W. (1933). **Hairy Fibres of the Romney Sheep. I. Halo-Hairs and their Inheritance.**—*New Zealand J. Agric.* **46.** 10-22. 10 figs.

The author is dealing in a series of articles with the result of research work into hairiness of the Romney sheep and commences the series with an article on halo hairs and their inheritance. He explains that, in the lamb at birth, three types of hair fibres are recognized :—halo hairs, hairy sickle fibres and hairy curly-tip fibres.

The halo hairs begin development before birth of the lamb and at birth project above the coat. There is a correlation between the halo hairs of the back and the extremities and it is possible to grade lambs at docking time. Halo hairs are shed later, but the follicle produces a hairy fibre in the fleece of the older animals. Consequently, breeders who grade lambs for hairiness from the appearance of the young lamb have been acting on sound lines.

As hairiness following halo hairs is based on hereditary factors and as rigid culling of lambs has enabled breeders to eliminate this hairiness to a large extent, it is expected that the same form of culling applied to other forms of hairiness will yield the same results.—C. S. M. Hopkirk.

Barbour, H. G., & Winter, J. E. (1931). **Magnesium Absorption in Dogs and its Effect upon the Metabolism of Calcium.**—*J. Pharmacol. Exp. Therap.* **43.** 607-620. 11 tables. [10 refs.]

If dogs are fed large quantities (200 mg. per kg. weight) of magnesium oxide, lactate or gluconate the value of the serum magnesium is considerably raised, but the serum calcium appears to be unaffected. The magnesium absorption from the three compounds is not equal if less than 200 mg. is fed, but it is at this high value, probably owing to the greater solubility of the compounds containing the smaller quantity of magnesium. Further experimental work appears to justify the conclusion that from one to two-thirds of the total magnesium administered in organic form will be absorbed by dogs. Provided that adequate phosphate is present the calcium level of the body does not seem to be lowered by administration of magnesium, but if phosphate is low then calcium may be lost.

—W. R. Wooldridge.

—. (1931). **Recent Advances in Chemistry of the Vitamins.**—*Brit. Med. J.* June 27th. 1116-1117.

[Report of discussion not published by the Royal Society].

A report of a discussion at the Royal Society in which such notable workers in vitamin research as Sir F. G. Hopkins, A. Windaus, R. B. Bourdillon,

O. Rosenheim, H. von Euler, B. C. P. Jansen, R. A. Peters, H. Steenbock and E. V. McCollum took part.

Prof. Windaus (Göttingen) presented an account of his work on the chemistry of irradiated ergosterol and demonstrated lantern slides of vitamin D crystals and of their absorption spectra. In the process of irradiation with ultra-violet rays ergosterol finally disappeared and over-irradiation products replaced it. Vitamin D was an intermediate product which could itself be destroyed by over-irradiation.

Dr. R. B. Bourdillon (National Institute of Medical Research) spoke of a crystalline product obtained by English workers, similar to that of Windaus, and with an antirachitic activity of about 20,000 M.R.C. units per mg. This product, named calciferol, and obtained in quantities of 2 or 3 g. at a time by distillation, was chemically similar to ergosterol and it was safe to say that, even if it were not identical with vitamin D, it at least contained one substance which was essentially vitamin D, and that these crystalline products now obtained in Germany, England and Holland, were not merely negative products contaminated with the hitherto mysterious vitamin.

Prof. Euler (Stockholm) introduced the subject of vitamin A and mentioned experiments on the successful transmutation of carotene into this vitamin in the serum of hens.

Prof. Jansen (Amsterdam) reported isolation of small quantities of vitamin B in crystalline form, by classical precipitation methods. Dr. R. A. Peters (Oxford) expressed the view that the ultimate solution of the chemical nature of the vitamin B complex would have to take the physiological behaviour into account, and stated that Jansen's crystals showed marked B_4 activity. It was possible by fractional distillation with charcoal to effect almost complete separation of B_1 from B_4, but the separation of B_4, free from the physiological activities of B_1, was not so certain.

—H. H. Green.

TECHNIQUE.

Barkworth, H. (1931). **True Time required for Sterilisation. Hot Air and Flowing Steam.**—*Zlb. Bakt. II.* **84.** 353-357. 1 table. [9 refs.]

Sterility was tested by the growth of *B. subtilis* spores. It was found that with glass ware in closed tins two hours is required to reach 160°C. followed by one hour at that temperature. With open containers the period may be reduced to one hour and one half hour respectively, but one hour holding period is recommended for routine sterilization. In an ordinary (3 litre) steam sterilizer, 100°C. is not attained until 25 minutes after the surrounding steam.—G. D. Lander.

Pijper, A. (1931). **Red Cell Measurements: A Comparison of the Diffraction Method and the Microscopic Method.**—*J. Path. & Bact.* **34.** 771-777. 7 figs. [18 refs.]

Details are given of the measurement of red blood cells in seven blood smears (normal, pernicious anaemia before and after liver treatment, haemolytic icterus and secondary anaemia) by the author's improved diffraction method and the results compared with those obtained by direct microscopic measurement.

A beam of white light sent through the thin end of a blood smear at right angles results in diffraction of the rays by the cell edges, each cell producing a set of circular concentric spectra. The individual sets are made to coincide on a screen by means of a positive lens at the back of the blood smear, the screen standing at the focal distance from the lens. The innermost violet circle belongs to the larger

cells, the outermost red to the smallest cells and the yellow circle remains the expression of the mean diameter of all the cells. To calculate the mean diameter and the diameter of the largest and smallest cells (degree and quality of the anisocytosis), the radius of the yellow, the innermost violet and the outermost red circle is measured. These values are then substituted for (r) in the formula

$$d = \frac{1{\cdot}7\ \lambda \sqrt{f^2 + r^2}}{r}$$

in which the respective wavelength (for yellow $0{\cdot}59\mu$, for violet $0{\cdot}40\mu$ and for red $0{\cdot}66\mu$) is then substituted for (λ) ; f stands for the focal distance of the lens used and d is the diameter required.

The agreement between the results of the two methods of measurement are satisfactory. The illustrations show the Price-Jones curves and the diffraction micrometer lines for the seven cases examined.—J. R. M. INNES.

I. BIGGER, J. W. (1931). **Apparatus for Blood Culture.**—*Lancet.* **220.** 1212. 1 fig.

II. FISCHER, G. (1932). Ueber die Verwendbarkeit von festen und flüssigen Substraten bei Blutuntersuchungen. [**The Suitability of Solid and Liquid Media for Blood Examinations**].—*Zlb. Bakt. I.* (*Orig.*). **123.** 382-384. 2 plates.

I. [McCartney's method of obtaining blood cultures under sterile conditions away from the laboratory consists in withdrawing blood into a sterile syringe and inoculating it directly into a bottle containing the required broth. The bottle is fitted with a special rubber pad held down by a metal screw cap which has a hole punched in the centre of it. By the use of a " viskap," a cellulose preparation as commonly seen covering the stoppers of perfume bottles, the risk of contamination is eliminated and the media can be stored and transported with facility].

The author, after approving of the above method, suggests that, by putting a double strand of stout linen thread under the viskap prior to sterilization, it can be the more readily removed.

II. The author discusses the advantages and disadvantages of solid and liquid media when making a bacteriological examination of the blood.

Although when using liquid media a single colony cannot be selected and any contaminant is freely distributed throughout the medium, with careful technique the latter contingency may be minimized. In the author's experience streptococci frequently failed to grow on poured agar plates whereas a good growth was obtained in broth to which ascitic fluid had been added.

For diagnostic purposes the simultaneous use of both types is recommended.

—N. S. BARRON.

AMIES, C. R. (1932). **A Demonstration of Two New Laboratory Instruments, the Scopometer and the Spectro-Haemoglobinometer.**—*Trans. Roy. Soc. Trop. Med. Hyg. London.* **25.** 217-218.

The scopometer [similar to nephelometer] was that described by EXTON [(1929). *J. Amer. Med. Ass.* **92.** 709].

The spectro-haemoglobinometer was a modification of the Schwentker apparatus [(1930). *J. Lab. & Clin. Med.* **15.** 24.] the essential parts of which are a small direct vision spectroscope fixed in the eye-piece of a microscope and a microcolorimeter plunger replacing the objective. The coarse adjustment serves to vary the fluid depth of suitably diluted blood and the reading is taken on a scale engraved on the carriage.—H. H. GREEN.

NIESCHULZ, O. (1931). Ueber Luftfeuchtigkeit in Insektzuchtzimmern. [**On Humidity in Insect-Breeding Chambers**].—*Zlb. Bakt. I.* (*Orig.*). **121.** 519-520.

The author describes his methods of obtaining a regular degree of humidity in chambers used for experiments with flies. According to his chief method, the flies are kept in a cubical chamber with sides two metres long; a small bore canula connected with a water tap is directed towards a metal plate in the chamber and the stream of water is broken up into spray which falls to the floor of the chamber, the water being allowed to drain away through the bottom.

It is important to prevent the formation of condensation droplets on the side of the chamber and this is said to be achieved by the method described.—J. E.

MISCELLANEOUS.

JONESCU, G., & VAIDA, M. (1931). Der Wert des Tierbestandes und der Wert der tierischen Erzeugnisse in Rumänien. [**The Value of Livestock and Animal Products in Rumania**].—*Berl. tierärztl. Wschr.* **47.** 755-757. 3 tables. [7 refs.]

Over-production and diminished consumption have resulted in a reduction of corn prices to below pre-war prices. If this cheapening tendency were general, i.e., if prices of industrial products had also sunk, the agricultural population would not be so alarmed as they actually are. When, however, only field products have suffered a completely one-sided and sudden fall of prices, agriculture no longer pays. Without further examining the causes, the authors declare that a simple comparison of corn and stock districts shows clearly that the corn-growers are poor beside the stock-breeders. They supply statistical tables showing the value of stock and animal products, taking as a basis the published statistics of 1928. These show that the total value of Rumanian livestock was 78,061,831,400 lei, of which cattle comprise more than one half, horses a quarter, and the remaining animals the other quarter. The value of animal products for the same year is ascertained as 58,636,818,810 lei.—F. BULLOCK.

OFFICIAL AND OTHER REPORTS.

UNION OF SOUTH AFRICA. (1932). **18th Report of the Director of Veterinary Services and Animal Industry, Onderstepoort, Pretoria.** [DU TOIT, P. J.] In two vols. pp. 1094. Pretoria: Govt. Printer. [4to].

The 18th Report of the Onderstepoort Research Laboratories has recently been published. It includes reports of work done in the year ending August, 1932. The report is grouped in ten sections, and the titles of the articles are as follows:—

PROTOZOAL DISEASES.—Bovine Anaplasmosis. A Method of obtaining Pure Strains of *Anaplasma marginale* and *Anaplasma centrale* through Antelopes, by W. O. NEITZ and P. J. DU TOIT, pp. 3-20; The Trypanosome Infections of *Glossina pallidipes* in the Umfolosi Game Reserve, Zululand, by A. B. M. WHITNALL, pp. 21-30; A Note on *Aegyptianella pullorum* in the Fowl in South Africa, by E. M. ROBINSON and J. D. W. A. COLES, pp. 31-33.

VIRUS DISEASES.—The Immunization of Mules, with Formalized Horse-

Sickness virus, by P. J. du Toit and W. O. Neitz, pp. 35-47 ; On the Aetiology of Heartwater, by C. Jackson and W. O. Neitz, pp. 49-70 ; Rabies as it occurs in the Union of South Africa, by W. O. Neitz and I. P. Marais, pp. 71-98 ; East African Virus Disease in Pigs, by D. G. Steyn, pp. 99-109 ; Immunisation of Fowls against Fowl Pox by Use of Pigeon Pox Virus, by A. S. Canham, pp. 111-140.

Bacterial Diseases.—The Occurrence of *B. oedematiens* in South Africa, by J. R. Scheuber, pp. 141-143.

Parasitology.—Goat Mange. The Infectivity of Kraals, by P. J. du Toit and G. A. H. Bedford, pp. 145-152 ; Wild Antelopes as Carriers of Nematode Parasites of Domestic Ruminants—Part II, by H. O. Mönnig, pp. 153-172 ; *Syngamus indicus* : A New Nematode from the Indian Elephant, by H. O. Mönnig, pp. 173-175 ; On a New Species of *Tetrameres* (*Tetrameres paradisea* sp. nov.) from Stanley Cranes, by R. J. Ortlepp, pp. 177-182 ; Some Helminths from South African Chiroptera, by R. J. Ortlepp, pp. 183-196 ; Distribution of Glossina in the Bechuanaland Protectorate, by H. H. Curson, pp. 197-220 ; Description of *Argas striatus*, a new Species of Tick, by G. A. H. Bedford, pp. 221-222 ; A Synoptic Check-List and Host-List of the Ectoparasites found on South African Mammalia, Aves, and Reptilia. (Second Edition), by G. A. H. Bedford, pp. 223-523.

Mineral Deficiency and Metabolism.—A Study of the Mineral Content and Feeding Value of Natural Pastures in the Union of South Africa. (First Report), by P. J. du Toit, A. I. Malan, J. G. Louw, C. R. Holzapfel and G. C. S. Roets, pp. 525-577 ; Cystine and Sulphur Content of Bushes and Grasses in a Karroid Area (Fauresmith), by M. Henrici, pp. 579-595 ; The Effects of Sulphur on Merino Sheep and their Resistance to Potassium Cyanide Poisoning, by D. G. Steyn, pp. 597-610. Here follow a further series of papers on the study of mineral metabolism—XVIII. Phosphorus in the Nutrition of Sheep. (Final Report), by P. J. du Toit, A. I. Malan and J. W. Groenewald, pp. 611-630 ; XIX. Influence of Phosphorus and Other Minerals on Wool Growth, by J. E. Duerden, V. Bosman and P. S. Botha, pp. 631-649 ; XX. Iodine in the Nutrition of Sheep, by A. I. Malan, P. J. du Toit and J. W. Groenewald, pp. 651-676 ; XXI. A Comparison of Phosphatic Supplements for the Prevention of Aphosphorosis, by A. I. Malan and P. J. du Toit, pp. 677-702 ; XXII. Phosphorus, Calcium and Protein, by J. S. Otto, pp. 703-732 ; XXIII. Phosphorus and Iodine Supplements in Field Experiments with Sheep, by J. G. Bekker, pp. 733-750 ; XXIV. On the Administration of Phosphorus to Animals through their Water Supply, by J. G. Bekker, pp. 751-797 ; XXV. The Effect of Calcium and Magnesium Supplements on the Growth of Merino Sheep, by J. W. Groenewald, pp. 799-803 ; XXVI. The Effect of Fluorine on Pregnant Heifers, by P. J. du Toit, A. I. Malan, J. W. Groenewald and G. de Kock, pp. 805-817.

Sex Physiology.—Gland Grafting in Merino Sheep. Preliminary Observations on its Influence : (*c*) on Castrated Sheep, by J. Quinlan and I. P. Marais, pp. 819-830 ; The Vitality of the Spermatozoon in the Genital Tract of the Merino Ewe, with Special Reference to its Practical Application in Breeding, by J. Quinlan, G. S. Mare and L. L. Roux, pp. 831-870.

Poisonous Plants.—Investigations into the Toxicity of Known and Unknown Poisonous Plants in the Union of South Africa, by D. G. Steyn, pp. 871-891 ; *Chrysocoma tenuifolia Berg* Poisoning in Angora Goats and the Development of Tolerance, by D. G. Steyn, pp. 893-898 ; A Study of the Factors concerned in the Determination of the Toxicity of *Cotyledon orbiculata L.*, by D. G. Steyn, pp. 899-938 ; Experiments with Potassium Cyanide on Rabbits, by D. G. Steyn, pp. 939-945 ; Crotalariosis in Sheep, by D. G. Steyn and G. de Kock, pp.

947-953 ; Isolation and Chemical Examination of the Poisonous Principles of *Dimorphotheca spectabilis* Schltr. and *Dimorphotheca Zeyheri* Sond, by C. RIMINGTON, pp. 955-972.

ANIMAL INDUSTRY.—Growth of Wool in the Merino, by J. E. DUERDEN, C. A. MURRAY and P. S. BOTHA, pp. 973-990 ; Staple Length Variation and Distribution in the Fleece of the Merino, by J. E. DUERDEN and E. W. PALMER, pp. 991-1003.

DIPS AND DIPPING.—This section includes a series of three papers on Lime-Sulphur Dips. I. General Introduction. Lime-Sulphur Dips, by H. GRAF and T. J. WILKEN-JORDEN, pp. 1005-1014 ; II. A New Laboratory Method of Chemical Analysis, by T. J. WILKEN-JORDEN, pp. 1015-1027 ; III. A Preliminary Study of a Colorimetric Method as a Rapid Means of Control of Polysulphide Solutions, by T. J. WILKEN-JORDEN, pp. 1029-1036.

MISCELLANEOUS.—The Normal Temperature of Merino Sheep during January in the Karroo, and How it is Influenced by Exercise, by J. QUINLAN and G. S. MARE, pp. 1037-1040 ; Notes on the Flora of Ngamiland and Chobe. Part I. Outline of the Floral Regions, by H. H. CURSON, pp. 1041-1060 ; A Peculiar Case of Traumatism affecting the Metatarsal Bones, by N. T. V.D. LINDE, pp. 1061-1062. This section is concluded by a further series of papers on Anatomical Studies—No. 28. Hypospadias in a Merino Ram, by G. C. VAN DRIMMELEN and A. R. THIEL, pp. 1063-1066 ; No. 29. A Further Note on Free-Martinism, by H. H. CURSON, pp. 1067-1072 ; No. 30. On Two Cases of Atresia Ani, by H. H. CURSON, pp. 1073-1076 ; No. 31. On Two Cases of Acardiacus, by H. H. CURSON, pp. 1077-1080 ; No. 32. Atresia Ani with Rectum opening into Vagina in a Kitten, by W. D. MALHERBE, pp. 1081-1082 ; No. 33. Micrognathy in a Lamb, by W. J. WHEELER, pp. 1083-1084 ; No. 34. Faulty Jaws in Sheep, by G. S. MARE, pp. 1085-1086 ; No. 35. On the Origin of an Abdominal Cyst found in a Domestic Hen, by I. P. MARAIS, pp. 1087-1089 ; No. 36. On Two Anomalies of the Cervix Uteri in a Merino Sheep, by H. H. CURSON, pp. 1091-1092 ; No. 37. On a Hybrid Duiker, by R. BIGALKE, pp. 1093-1094. [Abstracts of most of these papers will appear in this *Bulletin* in due course].

—. (1931). **The Rockefeller Foundation Annual Report, 1931.** pp. 420. New York : The Rockefeller Foundation. [8vo.]

This is an interesting account of the world-wide activities of the Rockefeller Foundation. The report is divided into sections under the following headings :—Health Division, Medical Sciences, Natural Sciences, Social Sciences and Humanities.

In the report of the Health Division are given concise summaries of work, aided by grants from the Foundation, in connection with yellow fever, malaria, hookworm disease, respiratory and other diseases, and appended to the accounts of each aspect of the various conditions is a group of references bearing thereon. The work done is mainly upon human diseases. Reference is made to the value of hexylresorcinol as an ascaricide in human and especially in canine ascariasis (p. 74) and to work on canine ancylostomiasis (p. 75). Under Medical Sciences, an account is given of the manner in which the Foundation promotes exchange of information between various countries and provides fellowships and aid for research and teaching institutions.

[One cannot but admire the wonderful work which the Foundation is doing for humanity and the veterinarian can only hope that the scope of the Foundation's activities may before long be extended by the provision of grants to various

research institutes working in the wider field of veterinary science where the need is so great].—S. H. GAIGER.

—. (1931). Bericht über die Tätigkeit des Bakteriologischen Instituts der Landwirtschaftskammer Niederschlesien im Jahre 1929. **[Report of the Work of the Bacteriological Institute of the Lower Silesian Chamber of Agriculture, 1929]**. pp. 36. Breslau : Otto Gutsmann.

The report gives an account of the work done during 1929. The most numerous specimens received related to cattle (45,117) the next highest number being poultry (13,772). The number of specimens from other animals showed a decline on previous years. There were 361 bacteriological investigations on the flesh of compulsorily slaughtered animals. Of special interest was the setting up of machinery for the investigation of sterility, with special reference to tested and graded milk and the control of udder diseases. The clinical examinations for combating bovine tuberculosis were undertaken by the Institute's own veterinary staff with the assistance of 81 experienced veterinary surgeons. 3,444 farms with 92,097 cattle under examination were included in the campaign. Of these farms 56·6 per cent. were found free from open forms of tuberculosis. In the tuberculosis laboratory altogether 11,444 specimens were examined.

The cattle farms included in the sterility campaign were fewer by about 12·3 per cent. than in 1928, the reason being that farms belonging to Upper Silesia are now separately dealt with. The result of treatment (appropriate to the individual case) was that of a total of 6,387 controlled animals, 4,813 became pregnant.—F. BULLOCK.

—. (1931). Bakteriologisches und Serum-Institut, Dr. Schreiber, G.m.b.H., Institut der Wirtschaftsgenossenschaft deutscher Tierärzte zu Landsberg (Warthe). XV Mitteilungen, April 1931. **[15th Communication from the Bacteriological and Serum Institute, Dr. Schreiber, G.m.b.H., at Landsberg, April, 1931]**. pp. 95. 2 plates. [8vo]. Landsberg : Dermietzel & Schmidt.

This is a special volume to celebrate the 60th birthday of the director, Dr. Oswald SCHREIBER, whose portrait appears as a frontispiece. Former and present colleagues contribute articles as follows :—

NEUMANN-KLEINPAUL and STEFFAN, The Effect of Cardiozol on the Heart, Respiration and Blood Pressure in Healthy and Sick Horses ; W. GEIGER, Causes of Losses after Simultaneous Inoculation with Swine Plague Virus ; JURASKE, On the Length of Time Blood can usefully be stored in Slaughterhouses ; STICKDORN, (1) On some Cases of Alleged Insufficient Immunization after Inoculation against Fowl Diphtheria and Fowl Pox, (2) Immunizing Experiments on Mice and Horses with Methylene Blue Swine Erysipelas Cultures, (3) Experiments in Active Immunization of White Mice with Swine Erysipelas Bile Cultures, (4) Laboratory Experiments with Nipasol M. Natrium (p-Oxybenzo-acid ester), (5) On the Germicidal and Antiseptic Power of Carvasept ; K. von SANDE, (1) On the Effect of Pigments on Different Causal Organisms of Disease, (2) On Immunization against Infectious Abortion of Cattle, (3) The Pulfrich Photometer in the Service of Vaccine Production ; K. FRANTA, The Demonstration of *Br. abortus* Infection by Precipitation ; A. MEYER, Tubercle Bacilli in Milk from Cows with Healthy Udders, and Dr. M. SCHREIBER, Tuberculosis Research and Immunization.

The volume ends with a report on the ordinary work of the institute for 1930 by Dr. W. STICKDORN.—F. BULLOCK.

—. (1932). **Report of the Committee on Miscellaneous Transmissible Diseases [American Veterinary Medical Association].**—*J. Amer. Vet. Med. Ass.* **80.** 509-512.

No outbreak of foot and mouth disease occurred in the United States in 1931. The situation regarding haemorrhagic septicaemia was also fairly satisfactory and some experiments have been commenced to determine the value of aggressin and bacterin preventive inoculations for this disease. Anaplasmosis, which appears to occur in many parts of the States, is apparently due to a single type of virus and can be transmitted by either *Rhipicephalus sanguineus* or *Dermacentor variabilis* ticks. No specific treatment has been discovered for this disease. Encephalomyelitis of equines appears to be a serious problem cropping up annually in the summer, involving a large number of horses and mules with a mortality of about 50 per cent. There is very little definite knowledge about this disease and a solution of the problem is essential for the continued economic value of the horse.

—NORMAN HOLE.

I. BRUNETT, E. L. (1931). **Report of the Diagnostic Work on Poultry Diseases at Ithaca.**—*New York State Vet. Coll. Rep. 1929-1930.* pp. 48-50.

II. HENDRICKSON, J. M., & HILBERT, K. F. (1931). **Report of the Poultry Disease Laboratory at Farmingdale, Long Island.**—*Ibid.* pp. 51-55. 1 table.

I. The report deals with the period July 1st, 1929 to June 30th, 1930. At the Ithaca and six associated laboratories 58,329 chickens were tested for pullorum disease. Two cases of pullorum infection in turkeys are reported. The author states that pullorum infection in mature birds does actually spread, but not so rapidly as is supposed. He points out that their experiments show the necessity for the removal of reactors from a flock if control is to be successful. *Bact. aertrycke* infection was confirmed in a large pigeon plant.

II. 2,875 birds were examined at this laboratory during the same period as detailed under I. *Bact. pullorum* was isolated from adult birds from two flocks where the owners had been feeding unfertile and dead-germ eggs to the adult flock. The owners stated that they boiled the eggs before use. Eggs were unobtainable for examination. The veterinarians on the island tested 11,619 birds for pullorum infection and found 3·5 per cent. reactors.

Last year a report was furnished on pullorum disease in poults with high mortality. Nine survivors matured and serum from four of these showed some degree of agglutination in a dilution of 1 : 32.

An outbreak of pullorum disease was diagnosed in pheasant chicks ; 200 were stated to have died out of a group of 575 during the first eight days. The pheasants were hatched out in an incubator which had been disinfected with formalin gas before use.

Coccidiosis was very prevalent during the year, causing heavy losses. In two sparrows examined large numbers of coccidia belonging to the genus *Isospora* were present in the intestines and caeca. Attempts to infect young chickens by feeding the sporulated oocysts of this coccidium failed.

Tuberculosis on a " bird fancier's " farm was diagnosed in nine ducks, three geese, four pheasants and five turkeys.

Blackhead was diagnosed in a nine months old pea-fowl. This bird was accommodated on a range that had been used for turkeys for a number of years.

Air-sac infections are stated to have been prevalent in flocks with a previous history of infectious bronchitis. The walls of the air sacs were thickened and covered with a caseous or mouldy material. In the caseous type, the fowl cholera organism was isolated in a large number of cases and from the mouldy material a member of the aspergillus group.—NORMAN DOBSON.

BOOK REVIEWS.

WATT, J. M., [M.B., Ch.B. (Edin.) Professor of Pharmacology in the University of Witwatersrand, Johannesburg] & BREYER-BRANDWIJK, Maria G. [Phil.D. (Utrecht), Apotheker (Utrecht). Research worker in Phyto-chemistry in the Department of Pharmacology in the University of the Witwatersrand, Johannesburg]. (1932). **The Medicinal and Poisonous Plants of Southern Africa.** pp. 314. 26 plates (12 coloured), 1 chart. [numerous refs.] Edinburgh : E. & S. Livingstone. [4to.] [25s.]

This volume gives an excellent and comprehensive survey of our present knowledge of Southern African plants of pharmacological and toxicological interest. The recent laboratory and field researches of the veterinary staffs have given the Union of South Africa a foremost place in pioneer work on plant poisoning amongst stock and in this book will be found full and up-to-date references to these labours in what has been till recently a virgin field. Not the least of its merits is the collection within one volume of a summary narrative, which should prevent over-lapping and repetition, giving to future workers a reliable survey of the ground of research so far covered.

A perusal of these pages will serve to impress the reader with the wide varieties in active principles and effects within natural orders and from genus to genus, and it cannot fail to be noticed that in a large proportion of cases our knowledge of the chemistry of these active principles is sadly deficient.

The Northern European student will note with interest the absence from this survey of such well-known and important plants as *Aconitum*, *Digitalis* and *Taxus* spp., and the mention of *Datura* as an introduced species, to name only a few examples.

Nearly 100 pages are devoted to indexes of the botanical, English and Afrikaans names, active principles and native names of the plants described. In this way the authors have succeeded in crystallizing much valuable lore which, as they point out, is in danger of loss to science through the rising tide of "synthetic" medicine.

One doubts the statement that ricine of castor is not poisonous *per os* and a captious critic might cavil at the use of the term toxalbumin instead of phyto-toxine and the absence of reference to the fundamental work of EHRLICH and others on this topic, but no such minor criticism can detract from the intrinsic worth of this volume, which must find a place in the libraries of all workers in this branch of knowledge.—G. D. LANDER.

NÈGRE, L., & BOQUET, A. (1932). Le Traitement de la Tuberculose par l'Antigène Méthylique (Antigénothérapie). [**The Treatment of Tuberculosis by " L'antigène Méthylique " (Antigen-therapy)**]. pp. 236. 15 figs. Paris : Masson et Cie. [8vo.] [Fr. 35.]

In this monograph, which is intended primarily for clinicians of human medicine interested in the treatment of tuberculosis, the authors give an account of their researches into the merits of antigen-therapy, using an antigen prepared from Koch's bacillus by extraction with methyl alcohol. They also record the findings of clinicians who have used this method of treatment in practice.

The book is so arranged as to place before the clinician the available experimental and clinical evidence in order that he may judge for himself the value of the method. These aspects of the subject are dealt with in Part I. It contains 12 chapters, the first of which is devoted to the treatment of experimentally infected guinea pigs and rabbits by the methylic antigen. In the remaining chapters are

discussed the mode of action of the antigen and its use in the treatment of various forms of tuberculosis, including infantile tuberculosis. The second part of the book consists of three chapters embracing the comparative study of the biological and antigenic properties of this and other products obtained from *Mycobacterium tuberculosis*.

In the course of this book, the authors claim that considerable success has followed both the experimental and clinical use of this antigen. It is not put forward as a panacea nor as the specific remedy for which the world has been waiting since the days of Koch. Nevertheless, the numerous successes which are attributed to this inoffensive antigen call for it to be considered by all interested in the therapeutical side of tuberculosis.

The subject matter is presented in a very clear, readable and convincing manner and an excellent bibliography is appended.—GWILYM O. DAVIES.

FINE, J. [M.D., B.Sc., D.P.H. (Glas.), D.T.M. (Liverp.), Assistant to the Prof. of Public Health, Edinburgh University]. (1932). **Filterable Virus Diseases in Man.** pp. 144. 7 tables. [323 refs.] Edinburgh: E. & S. Livingstone. [8vo.]

The author reviews briefly and discusses the knowledge of virus diseases and suspected virus diseases in man. An appendix classifies all known virus diseases in man, animals, insects and plants. A useful volume for ready reference and recent information.—NORMAN HOLE.

BURROWS, H. [C.B.E., F.R.C.S. Assistant at the Research Institute of the Cancer Hospital]. (1932). **Some Factors in the Localisation of Disease in the Body.** pp. xi + 299. 8 plates. [450 refs.] London: Baillière, Tindall & Cox. [8vo.] [15s.]

In the introduction, the author points out that the localization of disease is often the first step toward recovery, and that "when aggressive agents have entered the body the immediate safety of the individual usually is ensured if the aggressors can be retained or collected into a circumscribed region where the integrity of the tissues is not a vital necessity, and where the powers of resistance may be exercised in concentrated force."

The book is an attempt to elucidate the circumstances in which segregation and retention come about and to determine by what artificial means these defensive processes may be assisted.

In the general summary, the author concludes that three conditions are required for the localization of many blood-borne diseases, namely:—(1) an abnormal permeability of the walls of the small bloodvessels; (2) the presence of forces which will transport the noxious agents through the endothelial cytoplasm and (3) the retention of noxious agents in the tissues under the influence of inflammation. These conditions lead to the localization, not only of the agents of disease, but of the factors of defence.

The author takes the reader through an interesting study of the localization of foreign proteins, dyes and fine inorganic particles, natural pigments, spirochaetes, bacteria, viruses, and cancerous growths, and then discusses the factors which influence such localization. In his general discussion he deals briefly with some therapeutical considerations of interest to the clinician.

Throughout the book there is an extensive review of the work of numerous investigators in this field as well as an account of the author's own investigations.

Though essentially a medical book, it has some interest for the veterinarian, specially the animal pathologist. References to examples amongst animal

diseases are scarce as perhaps is only to be expected. It is curious to find on p. 135 the virus of fowl pox given prominence as a " tumour-producing virus."

The print is large and easy to read and the eight coloured plates are excellent illustrations of what they are intended to show.—S. H. GAIGER.

BARGER, G. [F.R.S., Professor of Chemistry in Relation to Medicine in the University of Edinburgh]. (1931). **Ergot and Ergotism.** pp. xvi + 279. 41 figs., 6 plates, 10 tables. [44 pages of refs.] London: Gurney & Jackson. [8vo.] [15s.]

This is a monograph based on lectures delivered at the Johns Hopkins University, Baltimore, by Professor Barger, whose fundamental researches in the chemistry and pharmacology of ergot put him in the front rank of modern workers on this subject.

The book is a monograph in the best sense of the term, the quotation of over 800 references attesting to the full survey of the subject in its scientific, forensic, agricultural, legislative and historical aspects. It is impossible within the limits of a review to do more than indicate points of special suggestiveness and interest; in the former regard mention should be made of the probable explanation of the fact that western (French) epidemics illustrated the gangrenous, whereas eastern (German) epidemics were of the convulsive type of ergotism, the recent work of MELLANBY having shown that deficiency of vitamin A in dogs leads, on feeding with ergot, to spinal lesions which may account for the convulsive symptoms. Barger points out that, in the historic epidemics, the French peasantry in general had adequate rations of dairy produce as compared with their less favoured eastern confrères, and that in fact the Marburg faculty in 1597 had advised " good fresh eggs and butter " to ward off the disease. The possible influence of a second factor is a consideration worthy of the closest attention on the part of workers in the field of vegetable toxicology, who are so often baffled by the apparently erratic effects of such poisons as castor, mustard seed and saponins.

From the point of view of general interest attention should be drawn to the excellent historical survey of ergotism. Probably very few even of informed readers realize the extent of epidemics of ergotism from the tenth century onwards right down to 1926 and 1927, when some 2 per cent. of a population of half a million were affected in the Ural region of the U.S.S.R. The sociological and political lessons are significant. In Germany the disease was known as " peasant's (poor man's) sickness "; those who gained healing at such shrines as that of St. Anthony founded in 1093 near Vienne probably owed their betterment to the more generous feeding there experienced, relapsing on return to their normal ration of diseased " tail " corn.

Perusal of this volume will satisfy the reader that ergot stands easily first among poisons in respect to its historical importance and its potential incidence especially among more backward agrarian peoples where rye forms a staple diet. Fortunately ergotism has not played so important a part amongst livestock as with man. It has, however, been recorded and in addition to the traditional assertions by stock owners that ergot will cause an animal to slip her foal or calf, Barger refers to American reports, which *inter alia* signalize and illustrate sloughing of the extremities. Moreover, ergotism in man is more amenable to control than is the case with epidemic diseases. The U.S.S.R. is one of the countries where ergotism constitutes a potential hazard and it is interesting to read that steps are there taken to forecast a possible outbreak.

Any student or worker desiring exact information on ergot will find it in this book.—G. D. LANDER.